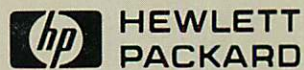


# Distributed Systems Network



DSN/DS HP 3000 to HP 1000  
Reference Manual for HP 3000 Users



**Distributed Systems Network**

# **DSN/DS HP 3000 TO HP 1000**

**Reference Manual for HP 3000 Users**



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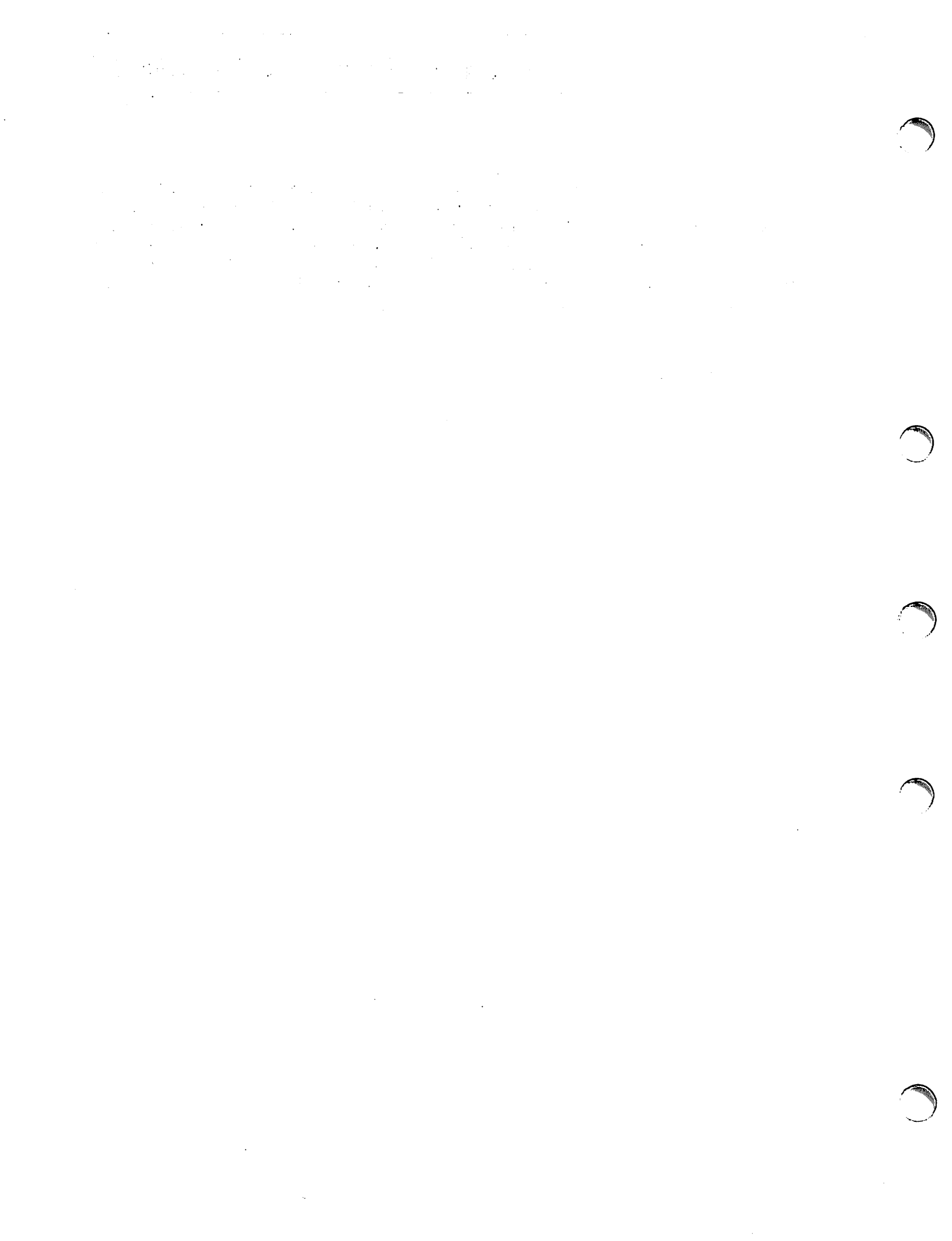
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# PREFACE

The purpose of this manual is to describe the capabilities of HP 3000 to HP 1000 communications using the Hewlett-Packard Distributed Systems Network, DSN/DS. These capabilities include using remote RTE commands to the HP 1000, using remote EXEC calls to the HP 1000, performing Remote File Access to files at the HP 1000, and perform Program-to-Program communications between the HP 3000 and HP 1000.

The capabilities that exist for HP 3000 to HP 1000 communications are a subset of the total capabilities available for HP 3000 to HP 3000 communications or HP 1000 to HP 1000 communications. That is, as an HP 3000 user, you will not be able to perform all of the functions available for HP 3000 to HP 3000 communications. Likewise, not all functions available for HP 1000 to HP 1000 communications are possible for HP 3000 to HP 1000 communications.

## NOTE

Most of the capabilities for HP 3000 to HP 1000 communications are programmatic. The interactive interface provides HP 1000 break mode commands only.

This manual will describe HP 3000 to HP 1000 communications assuming that the user is knowledgeable about the basic operating principles of both the HP 3000 and HP 1000 or that an HP 3000 user and HP 1000 user are working together.

The operating principles of the HP 3000 Series II/III/30/33/39/40/42/44/48/64 and 68 are described in the following manuals.

- *HP 3000 Computer Systems, MPE Commands Reference Manual* (30000-90009) (MPE IV release); or
- *HP 3000 Computer Systems, MPE V Commands Reference Manual* (32033-90006);
- *DSN/DS HP 3000 to HP 3000 User/Programmer Reference Manual* (32189-90001);
- *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* (32189-90002);
- *Data Communications Handbook* (30000-90105);
- *HP 3000 Computer System, MPE Intrinsic Reference Manual* (30000-90010) (MPE IV release); or
- *HP 3000 Computer Systems, MPE V Intrinsic Reference Manual* (32033-90007);
- *HP 3000 Computer System, System Manager/System Supervisor Reference Manual* (30000-90014) (MPE IV release);
- *HP 3000 Computer System, Console Operator's Guide* (32002-90004) (MPE IV release);
- *HP 3000 Computer Systems, MPE V System Operation and Resource Management Reference Manual* (32033-90005).



# PREFACE (continued)

## NOTE

The *HP 3000 Computer System, MPE V System Operation and Resource Management Reference Manual* listed above is the MPE V replacement for the *System Manager/System Supervisor* and *Console Operator's Guide* reference manuals.

The HP 1000 user should refer to the following manuals for information on using DS/1000-IV:

- *DS/1000-IV User's Manual* (91750-90002);
- *DS/1000-IV Network Manager's Manual, Vol. I and II* (91750-90010 and 91750-90011);
- *Getting Started With DS/1000-IV* (91750-90004);
- *DS/1000-IV Quick Reference Guide* (91750-90005);
- *Data Communications Handbook* (30000-90105);
- *RTE-IVB Programmer's Reference Manual* (92068-90004); or
- *RTE-6/VM Programmer's Reference Manual* (92084-90005); or
- *RTE-A Programmer's Reference Manual* (92077-90007).

## NOTE

For information about communications between an HP 1000 and an HP 3000 from the HP 1000, see the *DS/1000-IV User's Manual*.

# CONVENTIONS USED IN THIS MANUAL

## NOTATION

## DESCRIPTION

nonitalics

Words in syntax statements which are not in italics must be entered exactly as shown. Punctuation characters other than brackets, braces and ellipses must also be entered exactly as shown. For example:

EXIT;

*italics*

Words in syntax statements which are in italics denote a parameter which must be replaced by a user-supplied variable. For example:

CLOSE *filename*

[ ]

An element inside brackets in a syntax statement is optional. Several elements stacked inside brackets means the user may select any one or none of these elements. For example:

$\left[ \begin{array}{l} A \\ B \end{array} \right]$  User *may* select A or B or neither.

{ }

When several elements are stacked within braces in a syntax statement, the user must select one of those elements. For example:

$\left\{ \begin{array}{l} A \\ B \\ C \end{array} \right\}$  User *must* select A or B or C.

...

A horizontal ellipsis in a syntax statement indicates that a previous element may be repeated. For example:

[,*itemname*]....

In addition, vertical and horizontal ellipses may be used in examples to indicate that portions of the example have been omitted.

█

A shaded delimiter preceding a parameter in a syntax statement indicates that the delimiter *must* be supplied whenever (a) that parameter is included or (b) that parameter is omitted and any *other* parameter which follows is included. For example:

*itema*[█*itemb*][█*itemc*]

means that the following are allowed:

*itema*  
*itema, itemb*  
*itema, itemb, itemc*  
*itema, , itemc*

# CONVENTIONS (continued)

$\Delta$  When necessary for clarity, the symbol  $\Delta$  may be used in a syntax statement to indicate a required blank or an exact number of blanks. For example:

```
SET[(modifier)] $\Delta$ (variable);
```

underlining When necessary for clarity in an example, user input may be underlined. For example:

```
NEW NAME? ALPHA
```

In addition, brackets, braces or ellipses appearing in syntax or format statements which must be entered as shown will be underlined. For example:

```
LET var[[subscript]] = value
```

shading

Shading represents inverse video on the terminal's screen. In addition, it is used to emphasize key portions of an example.

The symbol    may be used to indicate a key on the terminal's keyboard. For example, RETURN indicates the carriage return key.

CONTROL *char*

Control characters are indicated by CONTROL followed by the character. For example, CONTROLY means the user presses the control key and the character Y simultaneously.

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The Hewlett-Packard Distributed Systems Network (HP-DSN) is a combination of hardware and software products that make it possible for Hewlett-Packard computer systems to communicate with one another, and with IBM mainframes as well. The connections can be made over hardwired lines, and/or over the public telephone facility, and/or across Public Data Networks (PDNs), in any mixture. This capability, coupled with our proven remote entry capability to IBM computer systems, provides a total solution to large-company electronic data processing (EDP) needs.

Within the realm of HP-DSN is the software subsystem that accomplishes HP computer-to-HP computer communication over these connecting lines. This software subsystem is called DSN/Distributed Systems (DSN/DS).

This manual describes how an HP 3000 user can communicate with an HP 1000 computer by establishing a communications link using DSN/DS. Since each of these computers perform functionally different data processing tasks, their association in a network provides you with the benefits of their combined capabilities.

Once the communications link is established, DSN/DS allows you to:

- Use remote RTE operator commands to the HP 1000 System. The RTE operator commands are executed in the remote HP 1000 but the output resulting from the executed commands will appear at your log-on terminal at the HP 3000 end. This is described in Section 3.
- Use remote EXEC calls to the HP 1000 System. Remote EXEC calls allow you to interface with remote I/O devices programmatically. This is described in Section 4.
- Perform Remote File Access to files in the HP 1000 System, using RFA intrinsics programmatically. This capability permits you to access any of the disc files residing at the remote HP 1000 as though they reside at your local HP 3000 site. This is described in Section 5.
- Perform Program-to-Program Communication between the HP 3000 and HP 1000 system, using Program-to-Program (PTOP) intrinsics. This capability permits programs residing in different HP computer systems to interactively exchange information with one another in a coordinated manner. This is described in Section 6.

But what exactly does this overall capability mean? It means that a large multidivisional corporation can have a truly coordinated world-wide network of computer systems. They are coordinated in the sense of tying together the various commercial and industrial functions within each division and factory, and they are also coordinated in the larger sense of tying together the various divisions and factories at the corporate level.

For example, imagine a large corporation which has factories in the United States, Canada, France, and West Germany. Within each factory there are HP 1000 computer systems performing such functions as inventory control, factory data collection, and operations management. With a Hewlett-Packard Distributed Systems Network these manufacturing information systems can be tied into an HP 3000 system which handles the factory's administrative functions (such as finance and accounting). The administrative systems of each factory can, in turn, be connected not only to one another but also to a mainframe computer (via DSN/RJE, DSN/MRJE, or DSN/SNA NRJE) at corporate headquarters. This



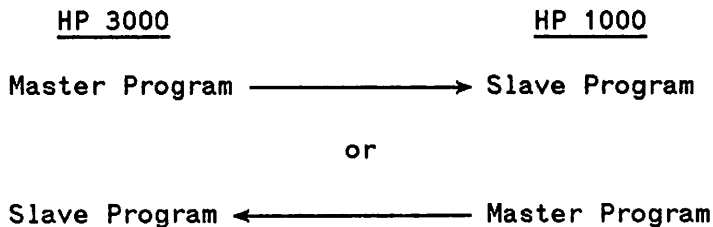
**Introducing DSN/DS**

overall networking capability makes it possible to perform financial analysis and control at a group and corporate level as well as at the individual factories.

The following summarizes the four ways you can use DS/3000 to communicate with HP 1000 systems:

	<b>HP 3000</b>	<b>HP 1000</b>
<b>REMOTE OPERATOR COMMANDS</b>	From a terminal, issue a remote command.	Execute an operator command.
<b>REMOTE EXEC CALLS</b>	Write and execute an SPL, FORTRAN, PASCAL, or COBOL/II program using remote EXEC calls.	Execute an EXEC call.
<b>REMOTE FILE ACCESS</b>	Write and execute an SPL, FORTRAN, PASCAL, or COBOL/II program using Remote File Access (RFA) intrinsics.	Access a disc file.
<b>PROGRAM TO PROGRAM COMMUNICATION</b>	Write and execute a master or slave program in SPL, FORTRAN, PASCAL, COBOL, COBOL/II, or BASIC using Program-to-Program intrinsics.	Write and execute a master or slave program in FORTRAN, PASCAL, or assembly language using Program-to-Program intrinsics.

In Program-to-Program (PTOP) communications, the programs can reside on either system:



As a simplified example of a computer network, imagine that you are in the same room with an HP 3000 (labeled "System A" in Figure 1-1) and that an HP 1000 (labeled "System B") resides in another part of the building. These two computers are connected to one another by a cable and a pair of communications interfaces. With DSN/DS you can use the processing capability of both the HP 3000 and the HP 1000 and pass data back and forth between them by entering commands through a single terminal.

To see how DSN/DS works in this simple example, read through the step-by-step procedure which follows.

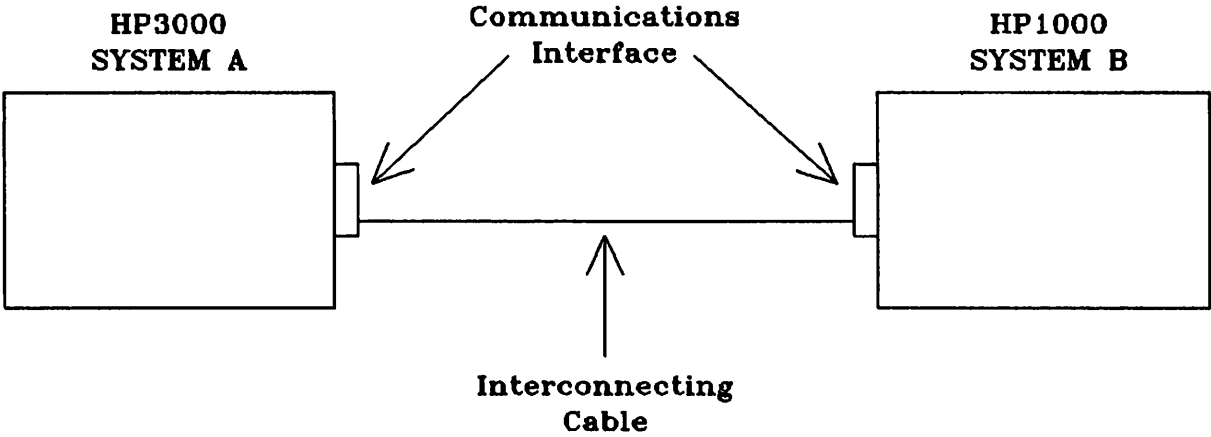


Figure 1-1. HP 3000 to HP 1000 Example

## Introducing DSN/DS

**Step 1.** Sit down at a terminal connected to System A and initiate a session.

RETURN

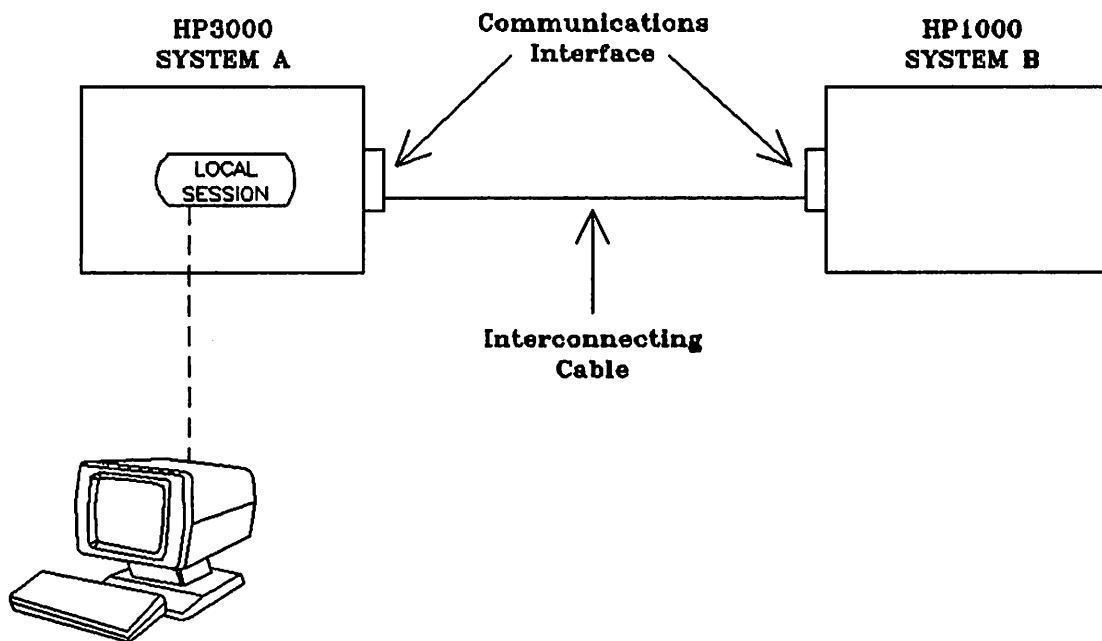
:HELLO USER.ACCOUNT

HP3000 / MPE IV C.00.04. WED, MAR 3, 1982, 9:05 AM

WELCOME TO SYSTEM A.

:

Within the context of DSN/DS, such a session is referred to as a local session because it is active within the HP 3000 to which your terminal is directly connected. This terminology becomes more meaningful later, since all you have actually done, so far, is initiate a standard MPE session. At this point, you have reached the situation illustrated in Figure 1-2.



**Figure 1-2. Initiating the Local Session**

**Step 2.** Now, open a communications line between System A and System B. Do this by entering a :DSLIME command.

```
:DSLIME RSYS1000
```

```
DS LINE NUMBER = #L3
```

```
:
```

In this example, RSYS1000 is the device class name for the particular line established during system configuration (in System A) you wish to use. DSN/DS opens the line and then assigns you a line number (3 in this example). This line number is analogous to the file number returned to you by the MPE File System when you open a file programmatically using the FOPEN intrinsic. Within your local session, it uniquely identifies the particular line that you have opened. This becomes significant only if you must open more than one communications line during a session.

**Step 3.** Now that you have acquired access to a communications line between System A and System B, you may execute remote RTE operator commands. Do this by entering a REMOTE command which includes an RTE operator command for the remote system. For example, use the TI command (RTE-6/VM) to determine the remote HP 1000 system time.

```
:REMOTE TI
```

```
1983 249 8 39 3
```

```
:
```

**Step 4.** Now determine the time from the local HP 3000 using the MPE SHOWTIME command.

```
:SHOWTIME
```

```
TUE, SEP 6, 1983, 8:40AM
```

```
:
```

Notice that in Steps 3 and 4 it is the presence or absence of the REMOTE prefix which determines whether a command is to be executed on the local system or on the remote system.

## Introducing DSN/DS

**Step 5.** Suppose you wish to use the line printer on the HP 1000. This time, instead of having to use the REMOTE prefix for each command, try a different technique. Enter the following:

```
:REMOTE  
#
```

This command gives you access to the remote system in such a way that all commands which follow can be entered in their normal form (without the prefix REMOTE). The # is the prompt character issued by DSN/DS (in place of the usual MPE colon prompt).

**Step 6.** Now determine the status of the remote line printer. If the line printer is down, enable it.

```
#EQ,6  
36 DV.12 0 B U 0 1  
#UP,6  
#EQ,6  
36 DV.12 0 B U 0 0  
#
```

**Step 7.** The work in System B is now completed so return control to your local session by typing a colon.

```
#:  
:
```

Note that you are now back in the local session in System A (signified by the colon prompt). To close the communications line, enter the following variation of the :DSLIN command:

```
:DSLIN RSYS1000;CLOSE  
1 DS LINE WAS CLOSED.  
:
```

Finally, terminate the local session.

```
:BYE  
CPU=1. CONNECT=11. TUE, SEP 6, 1983, 9:16 AM
```

As an HP 3000 user you need only issue a :DSLIN user command from your terminal to establish a link with an HP 1000 system.

However, before you can issue this command successfully, the hardware connections must be made, and the DS/3000 and DS/1000-IV software enabled. To do this:

- The HP customer engineer installs the hardware connection between the systems.
- The HP 1000 network manager generates a DS/1000-IV network and runs the program DINIT (and DSLIN if necessary). Instructions are provided in the *Network Manager's manuals*.
- The HP 3000 system supervisor configures the HP 3000 system to include DSN/DS 3000. Instructions are provided in the *System Manager/System Supervisor Manual*.
- The HP 3000 system operator initiates the :DSCONTROL command to enable the DS subsystem on the communications link. Instructions are provided in Appendix B of this manual.

Now you can log on to a terminal and issue the :DSLIN user command to establish communications with the HP 1000 system. (See Figure 2-1.)

## NOTE

The term **session** is used rather loosely in this section to differentiate between work done on the local system and work done on the remote system (as in **local session** and **remote session**). It is not always possible to establish a remote session with the HP 1000 in the literal sense. A literal definition of **session** appears later in this section during a brief discussion of **Session Access** versus **Non-session Access**.

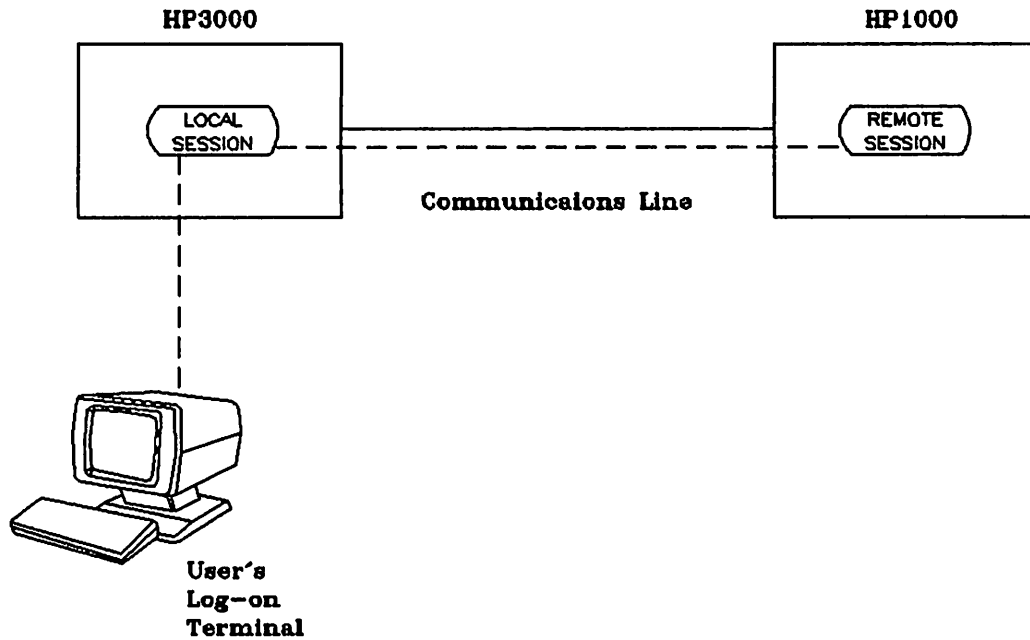


Figure 2-1. DSN/DS Communications Link (HP 3000 to HP 1000)

## OPENING A LINE

A communications link can be established over a hardwired communications line, over the public telephone network, or over an X.25 Public Data Network (PDN). The procedures for opening hardwired lines and for opening telephone lines differ only slightly. Much of the discussion which follows for Opening a Hardwired Line and Opening a Telephone Line is identical. The information is repeated for each topic so that you need only read that which is appropriate for your situation. Generally, once the connection to the remote computer is established, you will perceive no difference in the way DSN/DS performs.

### Opening a Hardwired Line

What is a hardwired line? In the general field of data communications there are two types of lines commonly referred to as hardwired. The first type is a dedicated path on the public telephone network that is leased from the telephone company for the private use of a computer-to-computer configuration. Such a line serves as a permanent connection between the two computers. The other type of hardwired line is a cable that is connected directly to the communications I/O interfaces of the two computers. Within the context of DSN/DS, hardwired always refers to the latter. However, the technique used for opening a line is the same for either a direct-connect line or a leased (nonswitched) telephone line.

The hardwired interconnecting cable connects to each computer by way of a communications interface. For a hardwire connection, there are two options available: the Hardwired Serial Interface (HSI), or the Intelligent Network Processor (INP) to Programmable Serial Interface (PSI).

The Hardwired Serial Interface (HSI) connection consists of the HP 30360A HSI interface card for the HP 3000 Series II and III (Series 30/33/40/44 and 64 do not support the HSI), and the HP 12889A HSI

card for the HP 1000. Each HSI card occupies one card slot in the Multiplexor channel of the HP 3000 and can accommodate up to four connections to HP 1000s. Only one of the four lines can be used at any given time and the HP 3000 console operator has control over which line is active. The HP 3000 Series II and III can accommodate a maximum of 2 HSI cards.

The Intelligent Network Processor (INP) to Programmable Serial Interface (PSI) connection utilizes microprocessor-based interface cards in both the HP 3000 and HP 1000, and offloads the task of DS transmission management from the CPU to the card. The connection is established by using the HP 30010A INP in the HP 3000 Series II and III or the HP 30020B INP in the HP 3000 Series 30/33/39/40/42/44/48/64 and 68 Computer Systems. On the HP 1000 side, an HP 12834A PSI card is used in the HP1000 M, E, and F Series and an HP 12082A PSI card is used in the HP 1000 A Series. The maximum distance allowed when using this connection is one kilometer.

The hardwire connections are summarized in Table 2-1.

**Table 2-1. Associations between Controllers and Systems (hardwired line)**

System	Controller
HP 3000 Series II and III	HP 30360A HSI card HP 30010A INP card
HP 3000 Series 30/33/39/40/42/44/48/64/68	HP 30020B INP card
HP 1000 M, E, and F Series	HP 12889A HSI card HP 12834A PSI card
HP 1000 A Series	HP 12889A HSI card HP 12082A PSI card

For most applications, the INP to PSI connection offers a much better method of HP 3000 to HP 1000 communication. The HSI cards impose substantial overhead on the CPU's (both 3000 and 1000) due to the combination of a fast transfer rate (2.5 megabits/sec) and a small interface buffer size (1 word). The INP to PSI connection operates at up to 56 kilobits/sec, but offers 1024 words of buffering on the INP and 1072 words of buffering on the PSI. The microprocessors on each card handle the communications protocol and handshaking, thus freeing the CPU for more important tasks.

It is relatively straightforward to obtain access to a hardwired communications line. All you are required to do is identify the particular communications interface you wish to use. You do this by specifying the device class name or logical device number associated during system configuration with the desired interface. In the example in Section 1, the :DSLIN command was used for this purpose, as follows:

```
:DSLIN RSYS1000
```

In the :DSLIN command you may also wish to specify the size of the DSN/DS line buffer to be used in conjunction with the line. The size of this buffer determines the maximum amount of data that can be sent or received in a single physical transmission over the line. Note that a transmission as you normally think of it (sending or receiving all or part of a file) may actually consist of many physical transmissions. In essence, this buffer size defines a blocking factor for the line. (See Figure 2-2.) A default buffer size is established during system configuration, and in most cases (as in the example in Section 1), you will find it satisfactory to let this default value prevail. Linebuffering is the same for both hardwired and telephone lines.



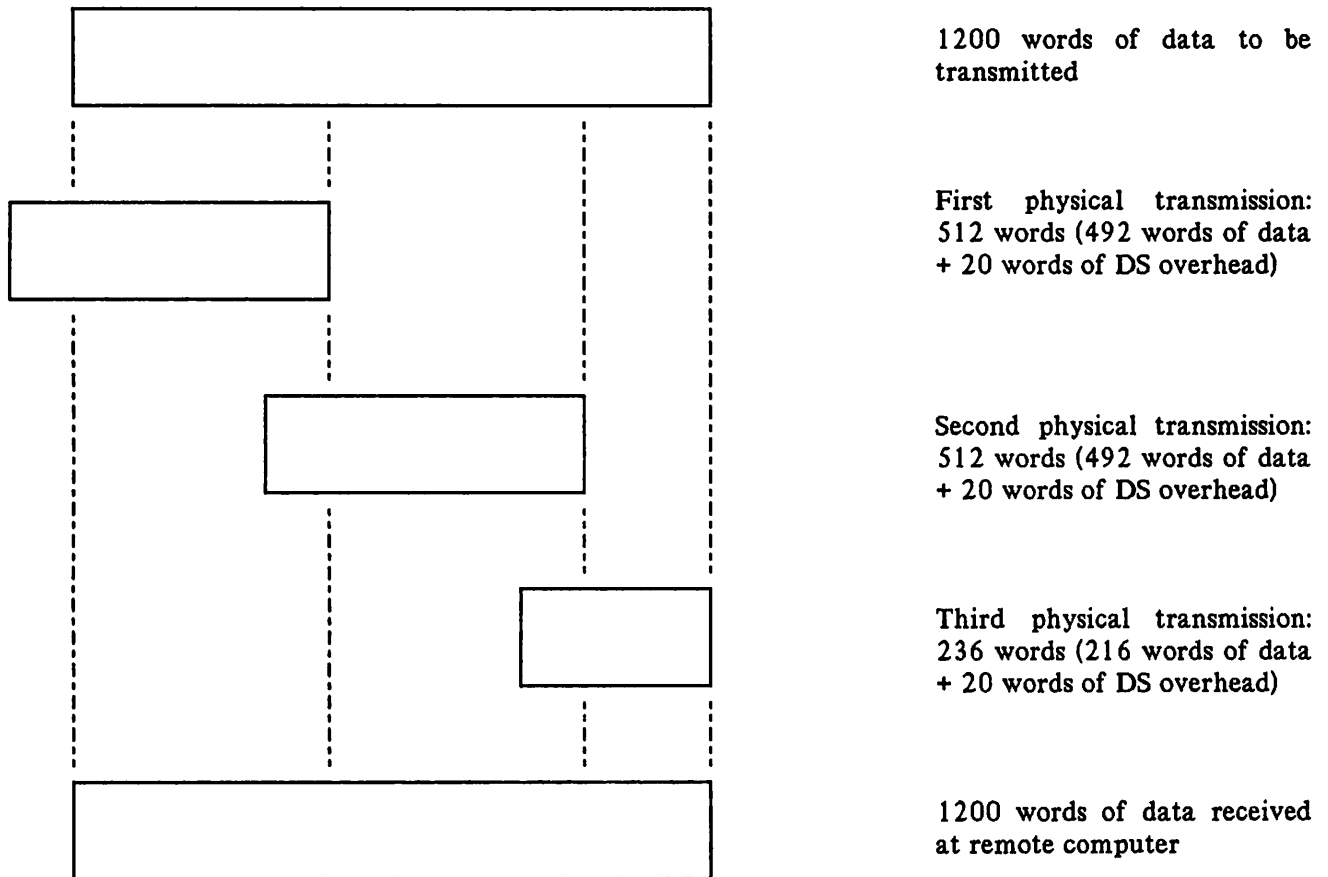


Figure 2-2. DSN/DS Line Buffer Example

When you execute a `:DSL` command, DSN/DS attempts to give you access to the specified communications line and, if successful, informs you of the assigned DS line number by displaying the following message at your terminal:

```
DS LINE NUMBER = #Lx
```

where `x` is the assigned DS line number. In the example in Section 1, the DS line number 3 was assigned. The DS line number is significant only if you open and use more than one communications line concurrently within a single local session (see "Opening Multiple Lines" later in this section).

Now that you have established the physical communications line via the `:DSL` command, you will be able to communicate with the remote HP 1000. With RTE-6/VM running on the HP 1000 M, E, and F Series, two possibilities exist depending on how the HP 1000 was GEN'd. The two possibilities are session access and non-session access. If the HP 1000 is an A Series running RTE-A, only non-session access is available.

**SESSION ACCESS.** Session access allows you to log on to the remote HP 1000 using either the `REMOTE HELLO RUSER.RGROUP` format or by issuing the `REMOTE` command and typing `HELLO RUSER.RGROUP` in response to the remote prompt (`#`). Session access allows you to access those files available for the `RUSER.RGROUP` session you have established. It is also possible to allow the DSN/DS 1000-IV software to establish a remote session for you by simply typing `REMOTE` and the RTE operator command. In this case, you will be logged on to a default session on the remote HP 1000. This allows you access to only those files assigned to the default session. See the *DS/1000-IV User's Manual* for details.

**NON-SESSION ACCESS.** If the HP 1000 M, E, or F Series was GEN'd for non-session access or if the HP 1000 computer is an A Series, it is not possible to establish a session with a set of files belonging to a particular group, that is, a `REMOTE HELLO` is not possible. Once you have established the DS line, you have access to *all* the system files by simply typing the `REMOTE` command followed by the HP 1000 command. RTE-A running on the HP 1000 A Series *only* supports non-session access.

## Opening a Telephone Line

A DSN/DS communications link can also be established over the public (dial-up) telephone network. In such a case, the information passed back and forth between the two computers travels over the same lines that are used for normal voice traffic. Each computer is interfaced to the telephone lines by way of a modem. (The term *modem* is a contraction of *MODulator-DEModulator*.) A modem is a device that translates digital signals (electrical impulses) generated by a computer into analog signals (tones) that can be transmitted over telephone lines, and vice versa.

The modem connects to the HP 3000 or the HP 1000 through the use of a communications interface. For the HP 3000 Series II and III, an HP 30055A SSLC card or an HP 30010A INP interface may be used. For the HP 3000 Series 30, 33, 39, 40, 42, 44, 48, 64, or 68, an HP 30020B INP interface is used. The HP 12793A BISSYNC MODEM PSI card is used in the HP 1000 M, E, and F Series and the HP 12073A BYSSYNC MODEM PSI card is used in the HP 1000 A Series. Refer to Table 2-2 for a summary of the hardware requirements for an HP 3000 to HP 1000 modem connection.

**Table 2-2. Associations between Systems and Controllers (telephone line)**

System	Controller
HP 3000 Series II and III	HP 30055A SSLC I/O card HP 30010A INP card
HP 3000 Series 30/33/39/40/42/44/48/64/68	HP 30020B INP card
HP 1000 M, E, and F Series	HP 12793A BISYNC MODEM PSI card
HP 1000 A Series	HP 12073A BISYNC MODEM PSI card

It is a little more complex to obtain access to a telephone line than to a hardwired line. First, you must identify the particular communications interface (INP or SSLC) you wish to use. You do this by specifying the device class name or logical device number of the communication line that was associated during system configuration with the desired interface. You can use the `:DSL` command for this purpose, as follows:

```
:DSL RSYS1000
```

In the `:DSL` command, you may also wish to specify the size of the DSN/DS line buffer to be used in conjunction with the line. The size of this buffer determines the maximum sized block that can be sent or received in a single physical transmission over the line. Note that a transmission as you normally think of it (sending or receiving all or part of a file) may actually consist of many physical transmissions. In essence, this buffer size defines a blocking factor for the line. (See Figure 2-2.) A default buffer size is established during system configuration, and in most cases (as in the example in Section 1), you will find it satisfactory to let this default value prevail. Linebuffering is the same for both hardwired and telephone lines.

Next, you may wish to supply a set of identification (ID) sequences to be used in verifying that the desired pair of computers are connected to one another. This is discussed under "ID Sequences" later in this section. Briefly, however, you may supply an ID sequence that identifies your HP 3000 and one or more ID sequences that identify those remote computers with which your HP 3000 may validly be connected. When a telephone connection is established between your HP 3000 and a remote HP 1000, the two computers exchange ID sequences and their validity determines whether or not the connection is to remain in effect. You use the `:DSL` command to supply ID sequences, as follows:

```
:DSL RSYS1000 ;LOCID="SYSTEM A" &
;REMID="SYSTEM X"
```

where SYSTEM A is the ID sequence identifying your HP 3000 and SYSTEM X is the ID sequence identifying the remote computer with which you want to establish a telephone connection.

Again, there are default values that can be established during system configuration. In most cases, however, you will at least want to explicitly identify the desired remote HP 1000 to be certain that the proper connection is being established.

Now you must establish the physical connection between the two computers by dialing (at the modem) the telephone number of the remote computer and responding (at the system console) to the dial request. If you wish to have the console operator of your HP 3000 dial the number for you, you may supply the desired number in the `:DSL` command and it will be displayed as part of a dial request message at the operator's console. In this case, you would supply the telephone number as follows:

```
:DSLIN RSYS1000 ;LOCID="SYSTEM A" &
;REMID="SYSTEM X" &
;PHNUM=555-1234
```

If autodial equipment is installed on the RSYS1000 line, the telephone number supplied in the :DSLIN command is used instead of the number configured for the line. If a phone number is not supplied in the :DSLIN command, the configured number will be dialed.

The various possibilities involved in establishing a telephone connection with a remote computer are discussed under "Dialing the Remote Computer" later in this section.

When you execute the :DSLIN command, DSN/DS attempts to give you access to the specified communications interface (INP or SSLC) and, if the telephone connection is successfully established, informs you of the assigned DS line number by displaying the following message at your terminal:

```
DS LINE NUMBER = #Lx
```

where x is the assigned DS line number. In the example in Section 1, the DS line number 3 was assigned. The DS line number is significant only if you open and use more than one communications line concurrently within a single local session (see "Opening Multiple Lines" later in this section).

Now that you have established the physical communications line via the :DSLIN command, you will be able to communicate with the remote HP 1000. With RTE-6/VM running on the HP 1000 M, E, and F Series, two possibilities exist depending on how the HP 1000 was GEN'd. The two possibilities are session access and non-session access. If the HP 1000 is an A Series running RTE-A, only non-session access is available.

**SESSION ACCESS.** Session access allows you to log on to the remote HP 1000 using either the REMOTE HELLO RUSER.RGROUP format or by issuing the REMOTE command and typing HELLO RUSER.RGROUP in response to the remote prompt (#). Session access allows you to access those files available for the RUSER.RGROUP session you have established. It is also possible to allow the DSN/DS 1000-IV software to establish a remote session for you by simply typing REMOTE and the RTE operator command. In this case, you will be logged on to a default session on the remote HP 1000. This allows you access to only those files assigned to the default session. See the *DS/1000-IV User's Manual* for details.

**NON-SESSION ACCESS.** If the HP 1000 computer M, E, or F Series was GEN'd for non-session access or if the HP 1000 is an A Series, it is not possible to establish a session with a set of files belonging to a particular group, that is, a REMOTE HELLO is not possible. Once you have established the DS line, you have access to *all* the system files by simply typing the REMOTE command followed by the HP 1000 command. RTE-A running on the HP 1000 A Series *only* supports non-session access.

## Specifying a Line

As you have seen, in order to open either a hardwired communications line or a dial-up telephone line, you must specify a device class name or logical device number identifying the particular communication line that is associated with a specific INP, HSI, or SSLC that you wish to use. But how do you figure out which name or number to specify? The discussion of this topic may seem a little complex and tedious, particularly at first reading. In actual practice, however, once the hardware and software configuration is installed and usable, most DSN/DS sites will post a notice defining all of the available communications lines and the proper device class names and logical device numbers for each. In that case, all of the detective work described in the following paragraphs is already done for you.

## The Communications Link

For each communications interface, there is a pair of associated drivers. First, there is the actual INP, HSI, or SSLC driver that directly controls the operation of the interface board. In addition, there is a DSN/DS communications driver that controls the operation of the INP, HSI, or SSLC driver. The names of these drivers are as follows:

IOINPO	(INP driver)
CSHBSCO	(HSI driver)
CSSBSCO	(SSLC driver)
IODS0	(DSN/DS communications driver, while utilizing the bisync protocol)
IODSX	(DSN/DS communications driver, while utilizing the X.25 capability)

If you have only one communications interface (INP, HSI, or SSLC) configured into your system, there is no question about which name or number to specify in a :DSLIN command. If there is more than one communications interface, however, you must know (or ask someone who knows) which CSHBSCO, CSSBSCO, or IOINPO pertains to the physical line you want to use.

One or more virtual terminal drivers (IODSTRM0 or IODSTRMX) should also be configured into the system. The IODSTRM0 or IODSTRMX entries allow users on another system to be logged on to this system and regulate the number of remote Session Main Processes (SMP) that can be assigned to a given line. Each IODSTRM0 or IODSTRMX entry is related to the proper communications interface entry by the number specified in the column labeled DRT. Figure 2-3 shows logical devices 60 through 64 are paired with logical device 12; Figure 2-4 shows logical device 69 paired with logical device 27; Figure 2-5 shows logical device 71 paired with logical device 29; and Figure 2-6 shows logical device 68 paired with logical device 26.

Now look at the appropriate sample I/O device table produced during system configuration (See Figure 2-3 and 2-4 for a hardwired line or Figure 2-5 and 2-6 for a telephone line).

In Figure 2-3, notice that the HSI board entries (logical devices 12 through 15) look the same except for the PORTMASK. The PORTMASK specifies which port on the board is to be used. There are also virtual terminals (logical devices 60 through 64) referencing back to logical device 12. Since only one port on the HSI board can be opened at a time, only one block of virtual terminal entries is needed for that board. As each port is opened individually by specifying the corresponding dsdevice in the :DSCONTROL command (see Appendix B), the system automatically reallocates the block of virtual terminal entries to the proper HSI board entry. This reallocation will not, however, show up in the I/O configuration table.

In Figure 2-3, the shaded items in the column labeled DRIVER NAME show four HSI lines (CSHBSCO) configured into the system as logical devices 12 through 15. For each one of these lines, there is a DSN/DS communications driver, IODS0, also configured into the system. Each IODS0 entry is related to the proper HSI entry by the number specified in the column labeled DRT (the # prefix indicates a back reference to a previously defined logical device number). Logical devices 50 through 53 are paired with logical devices 12 through 15, respectively. In this example, it is the device class name or logical device number of the appropriate IODS0 entry that would be used to specify the desired line.

LOG DEV #	DRT #	U N I T	C H A P T E R	T Y P E	SUB TYPE	TERMINAL TYPE	SPEED	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	4	0	0	0	6			128	0		IOMDISC1	SPOOL
2	5	0	0	0	3			128	0		IOMDISC0	SYSDISK
5	13	0	0	8	0			40	LP	JA S	IOCRD0	DISC
6	14	0	0	32	2			66	0	S	IOPRT0	CARD
7	6	0	0	24	0			128	LP		IOTAPE0	LP
8	6	1	0	24	0			128	LP		IOTAPE0	TAPE
9	6	2	0	24	0			128	LP		IOTAPE0	TAPE
10	6	3	0	24	0			128	LP	JA S	IOTAPE0	TAPE
11	20	0	0	34	0			128	0		IOPTPN0	BATAPE
12	16	0	0	19	3			0	0		CSHBSC0	PTPUNCH
13	16	0	0	19	3			0	0		CSHBSC0	HSI1
14	16	0	0	19	3			0	0		CSHBSC0	HSI2
15	16	0	0	19	3			0	0		CSHBSC0	HSI3
20	7	0	0	16	0	10	??	40	20	JAID	IOTERMO	HSI4
21	7	1	0	16	0	11	??	40	21	JAID	IOTERMO	CONSOLE
22	7	2	0	16	0	11	??	40	22	JAID	IOTERMO	TERM
23	7	3	0	16	0	11	??	40	23	JAID	IOTERMO	TERM
24	7	4	0	16	0	11	??	40	24	JAID	IOTERMO	TERM
25	7	5	0	16	1	11	??	40	25	JAID	IOTERMO	TERM
26	25	0	0	17	0			0	0		IOINP0	INP1
27	26	0	0	17	3			0	0		IOINP0	INP2
29	28	0	0	18	0			0	0		CSSBSC0	SSLC2
50	#12	0	0	41	0			128	0		IODS0	HDS1
51	#13	0	0	41	0			128	0		IODS0	HDS2
52	#14	0	0	41	0			128	0		IODS0	HDS3
53	#15	0	0	41	0			128	0		IODS0	HDS4
60	#12	0	0	16	8	??	??	40	60	J ID	IODSTRM0	DSTERM
61	#12	0	0	16	8	??	??	40	61	J ID	IODSTRM0	DSTERM
62	#12	0	0	16	8	??	??	40	62	J ID	IODSTRM0	DSTERM
63	#12	0	0	16	8	??	??	40	63	J ID	IODSTRM0	DSTERM
64	#12	0	0	16	8	??	??	40	64	J ID	IODSTRM0	DSTERM
66	#26	0	0	41	1			128	0		IODS0	DSL1
67	#27	0	0	41	1			128	0		IODS0	DSL2
68	#26	0	0	16	8	??	??	40	68	J ID	IODSTRM0	INP1
69	#27	0	0	16	8	??	??	40	69	J ID	IODSTRM0	INP2
70	#29	0	0	41	0		??	128	0		IODS0	SDS1
71	#29	0	0	16	8	??	??	36	71	J ID	IODSTRM0	DSTERM

Figure 2-3. Sample I/O Device Table (Hardwired Line with HSI)

## The Communications Link

In Figure 2-4, the shaded items in the column labeled DRIVER NAME show an INP (IOINP0) configured into the system as logical device 27. (Note that the subtype is 3, indicating hardwired.) For this line, there is a DSN/DS communications driver (IODS0) also configured into the system. The IODS0 entry is related to the proper INP entry by the number specified in the column labeled DRT (the # prefix indicates a back reference to a previously defined logical device number). Logical device 67 is paired with logical device 27. In this example, it is the device class name (DSLIN2) or logical device number (67) of the IODS0 entry that would be used to specify the desired line.

### NOTE

Figure 2-4 does not show a line configured for X.25 activity to an HP 1000. The back referencing scheme is identical to this example. However, the following differences should be noted for an X.25 configuration:

- The communications driver is named IODSX.
- The device class name or logical device number of an IODSX entry should not be used in a :DSLIN command (or in other commands, such as DSCOPY). To access the desired remote node, we encourage DSN/X.25 users to enter a nodename whenever a dsdevice is required. See "Specifying an X.25 Line" later in this section.

LOG DEV #	DRT #	U N I T	C H A P T E R	T Y P E	SUB TYPE	TERMINAL TYPE	SPEED	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	4	0	0	0	6			128	0		IOMDISC1	SPOOL
2	5	0	0	0	3			128	0		IOMDISC0	SYSDISK
5	13	0	0	8	0			40	LP	JA S	IOCRDO	DISC
6	14	0	0	32	2			66	0	S	IOPRTO	CARD
7	6	0	0	24	0			128	LP		IOTAPE0	LP
8	6	1	0	24	0			128	LP		IOTAPE0	TAPE
9	6	2	0	24	0			128	LP		IOTAPE0	TAPE
10	6	3	0	24	0			128	LP	JA S	IOTAPE0	TAPE
11	20	0	0	34	0			128	0		IOPTPN0	BATAPE
12	16	0	0	19	3			0	0		CSHBSC0	PTPUNCH
13	16	0	0	19	3			0	0		CSHBSC0	HSI1
14	16	0	0	19	3			0	0		CSHBSC0	HSI2
16	16	0	0	19	3			0	0		CSHBSC0	HSI3
20	7	0	0	16	0	10	??	40	20	JAID	IOTERMO	HSI4
21	7	1	0	16	0	11	??	40	21	JAID	IOTERMO	CONSOLE
22	7	2	0	16	0	11	??	40	22	JAID	IOTERMO	TERM
23	7	3	0	16	0	11	??	40	23	JAID	IOTERMO	TERM
24	7	4	0	16	0	11	??	40	24	JAID	IOTERMO	TERM
25	7	5	0	16	1	11	??	40	25	JAID	IOTERMO	TERM
26	25	0	0	17	0			0	0		IOINP0	TERM
27	26	0	0	17	0			0	0		<del>IOINP0</del>	INP1
29	28	0	0	18	0			0	0		CSSBSC0	INP2
50	#12	0	0	41	0			128	0		IODS0	SSLC2
51	#13	0	0	41	0			128	0		IODS0	HDS1
52	#14	0	0	41	0			128	0		IODS0	HDS2
53	#15	0	0	41	0			128	0		IODS0	HDS3
60	#12	0	0	16	8	??	??	40	60	J ID	IODSTRM0	HDS4
61	#12	0	0	16	8	??	??	40	61	J ID	IODSTRM0	DSTERM
62	#12	0	0	16	8	??	??	40	62	J ID	IODSTRM0	DSTERM
63	#12	0	0	16	8	??	??	40	63	J ID	IODSTRM0	DSTERM
64	#12	0	0	16	8	??	??	40	64	J ID	IODSTRM0	DSTERM
65	#12	0	0	16	8	??	??	40	65	J ID	IODSTRM0	DSTERM
66	#26	0	0	41	1			128	0		IODS0	DSTERM
67	#27	0	0	41	1			128	0		<del>IODS0</del>	DSL1
68	#26	0	0	16	8	??	??	40	68	J ID	IODSTRM0	DSL2
69	#27	0	0	16	8	??	??	40	69	J ID	<del>IODSTRM0</del>	INP1
70	#29	0	0	41	0		??	128	0		IODS0	INP2
71	#29	0	0	16	8	??	??	36	71	J ID	IODSTRM0	SDS1
												DSTERM

Figure 2-4. Sample I/O Device Table (Hardwired Line with INP)



## The Communications Link

In Figure 2-5, the shaded items in the column labeled DRIVER NAME show one SSLC (CSSBSC0) configured into the system as logical device 29. (Note that the subtype is 0, indicating a switched telephone line.) Notice the DSN/DS communications driver, IODS0, is related to the SSLC entry by the number specified in the column labeled DRT (the # prefix indicates a back reference to a previously defined logical device number). Logical device 70 is paired with logical device 29. It is the device class name (SDS1) or logical device number (70) of the IODS0 entry that would be used to specify the desired line.

LOG DEV #	DRT #	U N I T	C H A P T E R	T Y P E	SUB TYPE	TERMINAL TYPE	SPEED	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	4	0	0	0	6			128	0		IOMDISC1	SPOOL SYSDISK
2	5	0	0	0	3			128	0		IOMDISCO	DISC
5	13	0	0	8	0			40	LP	JA S	IOCRDO	CARD
6	14	0	0	32	2			66	0	S	IOPRTO	LP
7	6	0	0	24	0			128	LP		IOTAPE0	TAPE
8	6	1	0	24	0			128	LP		IOTAPE0	TAPE
9	6	2	0	24	0			128	LP		IOTAPE0	TAPE
10	6	3	0	24	0			128	LP	JA S	IOTAPE0	BATAPE
11	20	0	0	34	0			128	0		IOPTPN0	PTPUNCH
12	16	0	0	19	3			0	0		CSHBSCO	HSI1
13	16	0	0	19	3			0	0		CSHBSCO	HSI2
14	16	0	0	19	3			0	0		CSHBSCO	HSI3
16	16	0	0	19	3			0	0		CSHBSCO	HSI4
20	7	0	0	16	0	10	??	40	20	JAID	IOTERMO	CONSOLE
21	7	1	0	16	0	11	??	40	21	JAID	IOTERMO	TERM
22	7	2	0	16	0	11	??	40	22	JAID	IOTERMO	TERM
23	7	3	0	16	0	11	??	40	23	JAID	IOTERMO	TERM
24	7	4	0	16	0	11	??	40	24	JAID	IOTERMO	TERM
25	7	5	0	16	1	11	??	40	25	JAID	IOTERMO	TERM
26	25	0	0	17	0			0	0		IOINPO	INP1
27	26	0	0	17	3			0	0		IOINPO	INP2
29	28	0	0	18	0			0	0		<del>CSHBSCO</del>	SSLC2
50	#12	0	0	41	0			128	0		IODS0	HDS1
51	#13	0	0	41	0			128	0		IODS0	HDS2
52	#14	0	0	41	0			128	0		IODS0	HDS3
53	#15	0	0	41	0			128	0		IODS0	HDS4
60	#12	0	0	16	8	??	??	40	60	J ID	IODSTRM0	DSTERM
61	#12	0	0	16	8	??	??	40	61	J ID	IODSTRM0	DSTERM
62	#12	0	0	16	8	??	??	40	62	J ID	IODSTRM0	DSTERM
63	#12	0	0	16	8	??	??	40	63	J ID	IODSTRM0	DSTERM
64	#12	0	0	16	8	??	??	40	64	J ID	IODSTRM0	DSTERM
65	#12	0	0	16	8	??	??	40	65	J ID	IODSTRM0	DSTERM
66	#26	0	0	41	1			128	0		IODS0	DSL1
67	#27	0	0	41	1			128	0		IODS0	DSL2
68	#26	0	0	16	8	??	??	40	68	J ID	IODSTRM0	INP1
69	#27	0	0	16	8	??	??	40	69	J ID	IODSTRM0	INP2
70	#29	0	0	41	0		??	128	0		IODS0	SDS1
71	#29	0	0	16	8	??	??	36	71	J ID	IODSTRM0	DSTERM

Figure 2-5. Sample I/O Device Table (Telephone Line with SSLC)

## The Communications Link

In Figure 2-6, the shaded items in the column labeled DRIVER NAME show an INP (IOINP0) configured into the system as logical device 26. (Note that the subtype is 0. This indicates that the INP is used for a dial-up line.) For this line, there is a DSN/DS communications driver, IODS0, also configured into the system. The IODS0 entry is related to the proper INP entry by the number specified in the column labeled DRT (the # prefix indicates a back reference to a previously defined logical device number). Logical device 66 is paired with logical device 26. It is the device class name (DSL1NE1) or logical device number (66) of the IODS0 entry that would be used to specify the desired line.

LOG DEV #	DRT #	U N I T	C H A P T E R	T Y P E	SUB TYPE	TERMINAL TYPE	SPEED	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	4	0	0	0	6			128	0		IOMDISC1	SPOOL SYSDISK
2	5	0	0	0	3			128	0		IOMDISC0	DISC
5	13	0	0	8	0			40	LP	JA S	IOCRD0	CARD
6	14	0	0	32	2			66	0	S	IOPRT0	LP
7	6	0	0	24	0			128	LP		IOTAPE0	TAPE
8	6	1	0	24	0			128	LP		IOTAPE0	TAPE
9	6	2	0	24	0			128	LP		IOTAPE0	TAPE
10	6	3	0	24	0			128	LP	JA S	IOTAPE0	BATAPE
11	20	0	0	34	0			128	0		IOPTPN0	PTPUNCH
12	16	0	0	19	3			0	0		CSHBSC0	HSI1
13	16	0	0	19	3			0	0		CSHBSC0	HSI2
14	16	0	0	19	3			0	0		CSHBSC0	HSI3
16	16	0	0	19	3			0	0		CSHBSC0	HSI4
20	7	0	0	16	0	10	??	40	20	JAID	IOTERM0	CONSOLE
21	7	1	0	16	0	11	??	40	21	JAID	IOTERM0	TERM
22	7	2	0	16	0	11	??	40	22	JAID	IOTERM0	TERM
23	7	3	0	16	0	11	??	40	23	JAID	IOTERM0	TERM
24	7	4	0	16	0	11	??	40	24	JAID	IOTERM0	TERM
25	7	5	0	16	1	11	??	40	25	JAID	IOTERM0	TERM
26	25	0	0	17	0			0	0		IOINP0	INP1
27	26	0	0	17	3			0	0		IOINP0	INP2
29	28	0	0	18	0			0	0		CSSBSC0	SSLC2
50	#12	0	0	41	0			128	0		IODS0	HDS1
51	#13	0	0	41	0			128	0		IODS0	HDS2
52	#14	0	0	41	0			128	0		IODS0	HDS3
53	#15	0	0	41	0			128	0		IODS0	HDS4
60	#12	0	0	16	8	??	??	40	60	J ID	IODSTRM0	DSTERM
61	#12	0	0	16	8	??	??	40	61	J ID	IODSTRM0	DSTERM
62	#12	0	0	16	8	??	??	40	62	J ID	IODSTRM0	DSTERM
63	#12	0	0	16	8	??	??	40	63	J ID	IODSTRM0	DSTERM
64	#12	0	0	16	8	??	??	40	64	J ID	IODSTRM0	DSTERM
65	#12	0	0	16	8	??	??	40	65	J ID	IODSTRM0	DSTERM
66	#26	0	0	41	1			128	0		IODS0	DSL1
67	#27	0	0	41	1			128	0		IODS0	DSL2
68	#26	0	0	16	8	??	??	40	68	J ID	IODSTRM0	INP1
69	#27	0	0	16	8	??	??	40	69	J ID	IODSTRM0	INP2
70	#29	0	0	41	0			128	0		IODS0	SDS1
71	#29	0	0	16	8	??	??	36	71	J ID	IODSTRM0	DSTERM

Figure 2-6. Sample I/O Device Table (Telephone Line with INP)

## Specifying an X.25 Line

When specifying an X.25 line, you do not use the I/O device table. This is because X.25 uses node names, rather than LDEVs, to specify devices. To find out what node names are configured on your system, type the following:

```
:RUN NETCONF.PUB.SYS
```

```
>LIST
```

See the *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* for more information on NETCONF.

The format of the :DSLLINE command, as used to open an HP 3000 to HP 1000 line, is presented here. In addition to opening a hardwired line or a telephone line, this command can also be used for closing one or more communications lines (discussed later in this section).

## Syntax

```
:DSLLINE dsdevice  [;LINEBUF=buffer-size]  
                   [;EXCLUSIVE]  
                   [;QUIET]  
                   [;PHNUM=telephone-number]  
                   [;LOCID=local-id-sequence]  
                   [;REMIID=remote-id-sequence [,...remote-id-sequence]]  
                   [;OPEN]
```

### NOTE

The complete syntax of the :DSLLINE command includes parameters to indicate compression or no compression (COMP or NOCOMP). These parameters are not available on the HP 3000 to HP 1000 link.

## Parameters

*dsdevice*

(Required). This is the device class name or logical device number assigned to the DSN/DS communications driver (IODSO) during system configuration, or a logical node name for X.25. This parameter specifies what physical hardwired line or what communications interface (and modem) you wish to use.

### NOTE

DSN/X.25 users should always use a node name rather than a line identifier. The logical node name appears in the configuration file for a Public Data Network (PDN). A Remote Node (RN) table relates the logical node name (specified in this command) to the logical device number of the appropriate IODSX driver (the X.25 driver), and to the PDN address of the destination node.

## :DSLNE

### *buffer-size*

(Optional). A decimal integer specifying the size (in words) of the DSN/DS line buffer to be used in conjunction with the communications line. The integer must be within the range  $304 < \textit{buffer-size} < 4095$  when used with the SSLC or HSI, and between  $304 < \textit{buffer-size} < 1024$  when used with the INP. The default value is the buffer size entered in response to the PREFERRED BUFFER SIZE prompt during system configuration. This parameter overrides the MPE configured value when specified by the first user to open the given line.

### EXCLUSIVE

(Optional). This parameter, if present, specifies that you want exclusive use of the communications line. If the requested line or specified communications interface is already open and you have specified the EXCLUSIVE option, DSN/DS will deny you access to the line (you cannot open it). (See "Line Opening Failures" later in this section.) Opening an EXCLUSIVE line requires the user to have CS and ND capability.

### QUIET

(Optional). When you issue the :DSLNE command with this parameter added, the message identifying the DS line number is suppressed.

The additional parameters that pertain only to opening a telephone line are as follows:

### *telephone-number*

(Optional). A telephone number consisting of digits and dashes. The maximum length permitted (including both digits and dashes) is 20 characters. Provided that YES was entered in response to the DIAL FACILITY prompt during system configuration, this telephone number will be displayed at the operator's console of your HP 3000 and the operator will then establish the telephone connection by dialing that number at the modem. (When the autodial feature is present in your system, the number provided here is dialed automatically.) The default telephone number is the one entered in response to the PHONE NUMBER prompt during system configuration.

### *local-id-sequence*

(Optional). A string of ASCII characters contained within quotation marks. If you wish to use a quotation mark within an ASCII string, use two successive quotation marks. The maximum number of ASCII characters allowed in the string is 16.

The supplied string of ASCII characters defines the ID sequence that will be sent from your HP 3000 to the remote HP 1000 when you attempt to establish the telephone connection. If the remote HP 1000 does not recognize the supplied ID sequence as a valid one, the telephone connection is terminated. The default value is the ASCII string entered in response to the LOCAL ID SEQUENCE prompt during system configuration.

*remote-id-sequence*

(Optional). Same format as *local-id-sequence*.

The supplied strings of ASCII characters define those remote HP 1000 ID sequences that will be considered valid when you attempt to establish the telephone connection. If the remote HP 1000 does not send a valid ID sequence, the telephone connection is terminated. The default set of remote ID sequences consists of the ASCII string entered in response to the REMOTE ID SEQUENCE prompt during system configuration.

OPEN

Opens a DS line.



## Dialing the Remote Computer

When you are opening a telephone line, you may supply a telephone number as an optional parameter in the `:DSL` command to be dialed at the modem connected to the specified INP or SSLC. If you supply a telephone number, DSN/DS displays a message on the system console telling the operator to dial that number. The operator, after dialing the specified number, enters YES or NO through the system console `=REPLY` command to let DSN/DS know whether or not the telephone connection was successfully made. If the operator enters YES, DSN/DS proceeds with the exchanging of ID sequences. If the operator enters NO, your `:DSL` request is denied (you cannot open the line). In either case, your terminal's keyboard is disabled until the console operator responds.

If you do not supply a telephone number, the sequence of events is as described in the above paragraph, except that DSN/DS uses (by default) the first telephone number in the PHONELIST established during system configuration.

If you do not supply a telephone number and no PHONELIST was established during system configuration, an I/O request message is displayed at the system console, but it does not include the number to be dialed. This method might be used when you will dial the remote HP 1000 yourself. Remember, however, that the console operator must still know whether you dialed successfully, since he must respond to the console message before you are granted access to the line. Because your terminal's keyboard is disabled until the console operator responds with YES or NO, it is recommended that you always supply a telephone number in the `:DSL` command.

## ID Sequences

Once a telephone connection to a remote HP 1000 exists, the two computers exchange ID sequences with one another. Within the context of DSN/DS, an ID sequence is a string of up to 16 ASCII characters that identifies a particular computer.

During system configuration, each computer can be assigned a local ID sequence and a list of remote ID sequences. The local ID sequence identifies the particular computer in which it is established; the remote ID sequences identify those remote computers with which a communications link can be established over the public telephone network.

In the `:DSL` command, you can supply (as optional parameters) a local ID sequence and one or more remote ID sequences to be used instead of those established during system configuration. (See Figure 2-9.)

When a telephone connection is established between your HP 3000 and a remote HP 1000, the local ID sequence supplied in your `:DSL` command is transmitted to the remote system. The remote system then transmits its local ID sequence over the telephone line to your HP 3000. The received ID sequence is then compared against the remote ID sequence(s) supplied in your `:DSL` command. If that ID sequence is found to be valid, the telephone connection is considered successful and DSN/DS grants you access to the line. If the ID sequence received is not considered valid, your `:DSL` request is denied (you cannot open the line).

If you do not supply any ID sequences, DSN/DS uses those established during system configuration. If no ID sequences were established during system configuration and you do not supply any, no local ID sequence is transmitted from your HP 3000 to the remote system and any remote ID sequence received is considered valid.

## Multiple Users

Within a DSN/DS environment, it is possible for several users at either end of the line to share access to the same physical communications line or for a single user at one end of the line to obtain exclusive access to the line.

As previously mentioned in the discussion of the :DSL<sub>LINE</sub> command, the EXCLUSIVE parameter can be used to obtain exclusive access to the specified physical communications line. If you specify this parameter (and if access to the line is granted), no other user in either computer will be permitted to open that line until you close it. If you ask for exclusive access to a particular line and that line is already in use, DSN/DS denies your request (you cannot open the line). (See "Line Opening Failures" later in this section.)

For hardwired lines and for dial-up lines, multiple users at either end of the line can specify the same physical line in :DSL<sub>LINE</sub> commands and obtain access to that line as long as none of them requests exclusive access. In such a case, the users' data is multiplexed, so that each user's access to the line appears to be completely independent of all others. The exception for a telephone line is that all users, other than the one who originally opened the line, specify (explicitly or by default) the currently active remote ID sequence. Figures 2-7 through 2-11 present annotated examples, illustrating successful and unsuccessful attempts by different users to obtain access to the same line.

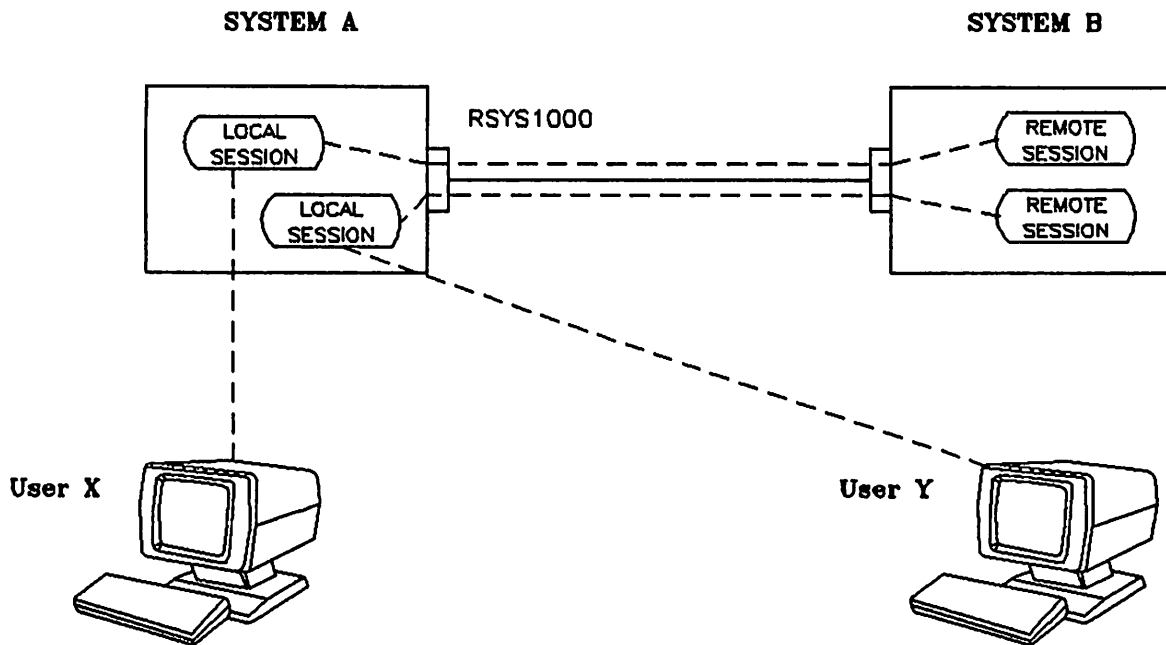


Figure 2-7. Multiple User Example 1

:HELLO USER.X

:HELLO USER.Y

:DSLIN RSYS1000

:DSLIN RSYS1000

:REMOTE HELLO USER.X

:REMOTE HELLO USER.Y

In this example, User X initiates a local session in System A, obtains access to the hardwired communications line that connects System A to System B, and initiates a remote session in System B. User Y subsequently initiates a local session in System A, obtains access to the same communications line, and initiates a remote session in System B. The request by User Y for the particular communications line is granted by DSN/DS because neither user asked for exclusive access to the line.

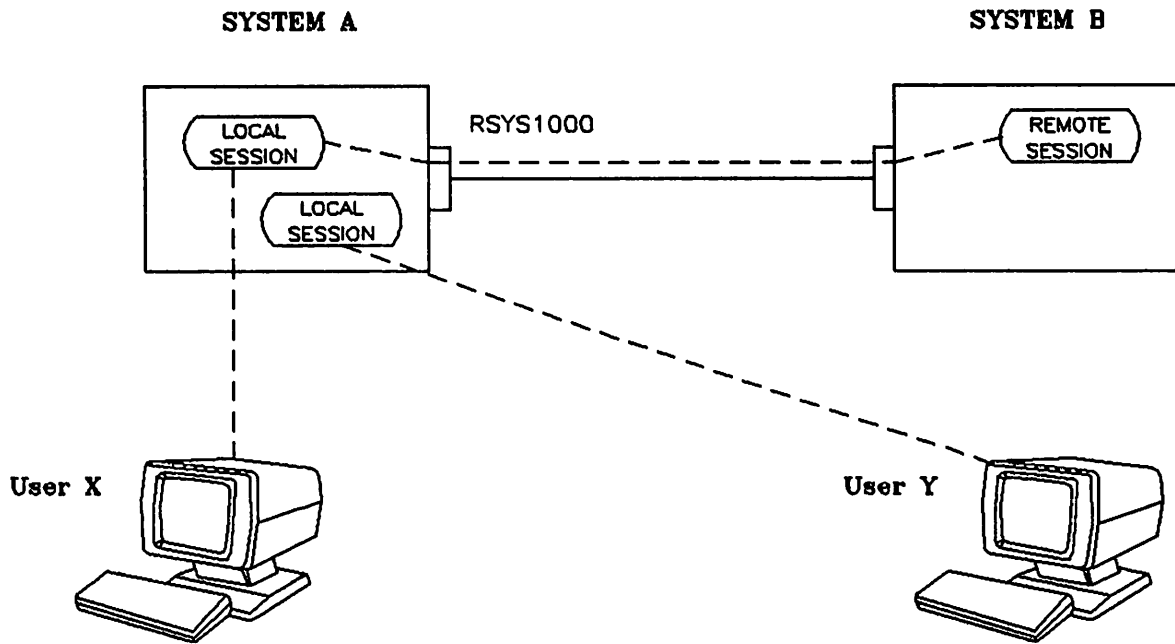


Figure 2-8. Exclusive Option Example

:HELLO USER.X

:HELLO USER.Y

:DSLIN RSYS1000;EXCLUSIVE

:DSLIN RSYS1000

:REMOTE HELLO USER.X

In this example, User X initiates a local session in System A, obtains exclusive access to the hardwired communications line that connects System A to System B, and initiates a remote session in System B. User Y subsequently initiates a local session in System A and requests access to the same communications line. The request is denied by DSN/DS because User X already has exclusive access to the specified line. DSN/DS responds with:

DS LINE IN USE EXCLUSIVELY OR BY ANOTHER SYSTEM. (DSERR 241)

Configured Local ID: A  
 Configured Remote IDs: B,C

Configured Local ID: B  
 Configured Remote IDs: A,C

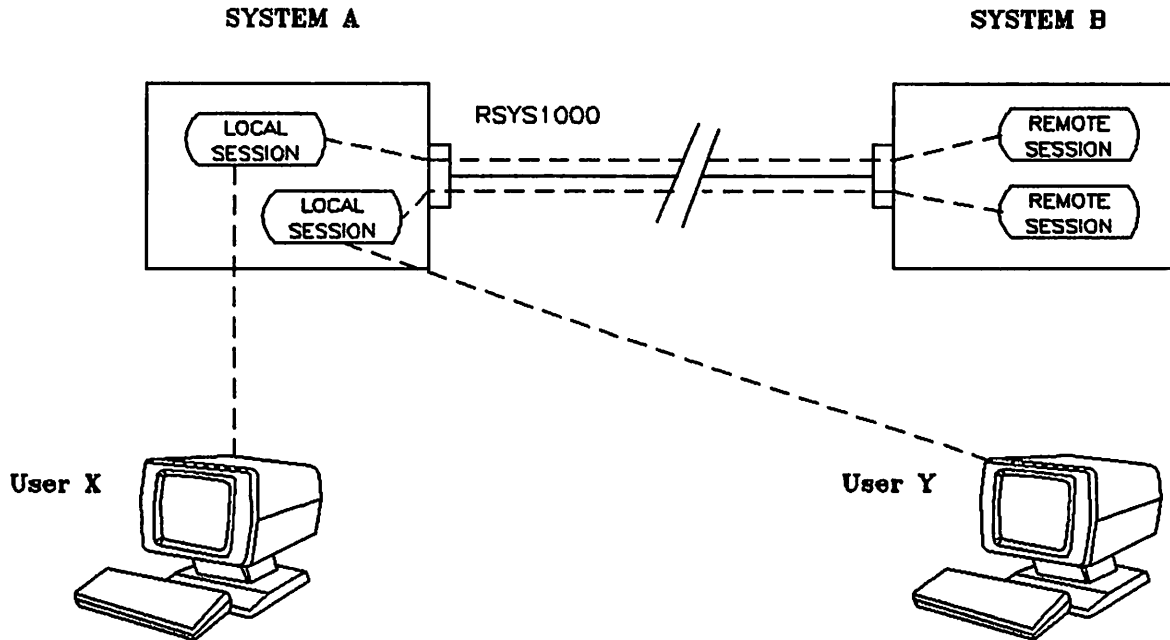


Figure 2-9. Dial-up Line Multiple User Example 1

:HELLO USER.X

:HELLO USER.Y

:DSLLINE RSYS1000 &  
                   ;PHNUM=555-1234 &  
                   ;REMID="B"

:DSLLINE RSYS1000 &  
                   ;PHNUM=555-1234 &  
                   ;REMID="B"

:REMOTE HELLO USER.X

:REMOTE HELLO USER.Y

In this example User X initiates a local session in System A and obtains access to the line identified by the device class name RSYS1000. The supplied telephone number is displayed at the system console of System A. The console operator establishes the telephone connection by dialing the number at the modem connected to the particular line and then enters YES through the system console to let DSN/DS know that the telephone connection was successfully made. The two computers exchange their configured local ID sequences. System A compares the received ID sequence (B) against the remote ID sequence specified by User X (REMID="B"). Since the received ID sequence is found to be valid, the telephone connection is allowed to remain in effect. User X then initiates a remote session in System B over the telephone line from his local log-on terminal.

User Y subsequently initiates a local session in System A and requests access to the same line (RSYS1000). Since that line is already open, DSN/DS ignores the supplied telephone number (no message is displayed at the system console). Access to the currently opened line is granted to User Y because neither user requested exclusive access and User Y specified the currently active remote ID sequence (REMID="B") in his DSLINE command.

Configured Local ID: A  
 Configured Remote IDs: B,C

Configured Local ID: B  
 Configured Remote IDs: A,C

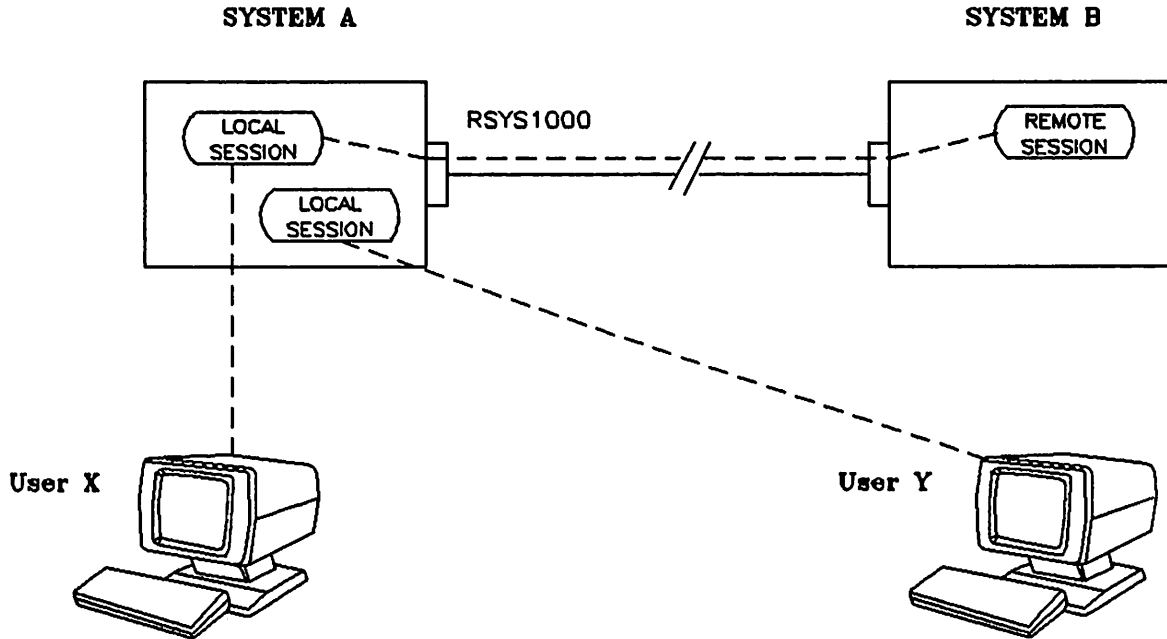


Figure 2-10. Dial-up Line Multiple User Example 2

:HELLO USER.X

:HELLO USER.Y

:DSLLINE RSYS1000 &  
                   ;PHNUM=555-1234 &  
                   ;REMID="B"

:DSLLINE RSYS1000 &  
                   ;PHNUM=555-2001 &  
                   ;REMID="C"

:REMOTE HELLO USER.X

In this example User X initiates a local session in System A and obtains access to the line identified by the device class name RSYS1000. The supplied telephone number is displayed at the system console of System A. The console operator establishes the telephone connection by dialing the number at the modem connected to the particular line and then enters YES through the system console to let DSN/DS know that the telephone connection was successfully made. The two computers exchange their configured local ID sequences. System A compares the received ID sequence (B) against the remote ID sequence specified by User X (REMID="B"). Since the received ID sequence is found to be valid, the telephone connection is allowed to remain in effect. User X then initiates a remote session in System B over the telephone line from his local log-on terminal.

User Y subsequently initiates a local session in System A and requests access to the same line (RSYS1000). Since that line is already open, DSN/DS ignores the supplied telephone number and no message is displayed at the system console. The request is denied by DSN/DS because the specified line is already open and User Y did not specify the currently active remote ID sequence (B) in the :DSLIN command. DSN/DS responds with:

COMMUNICATIONS INTERFACE ERROR. UNANTICIPATED CONDITION. (DSERR 255)



Configured Local ID: (none)

Configured Local ID: (none)

Configured Remote IDs: (none)

Configured Remote IDs: (none)

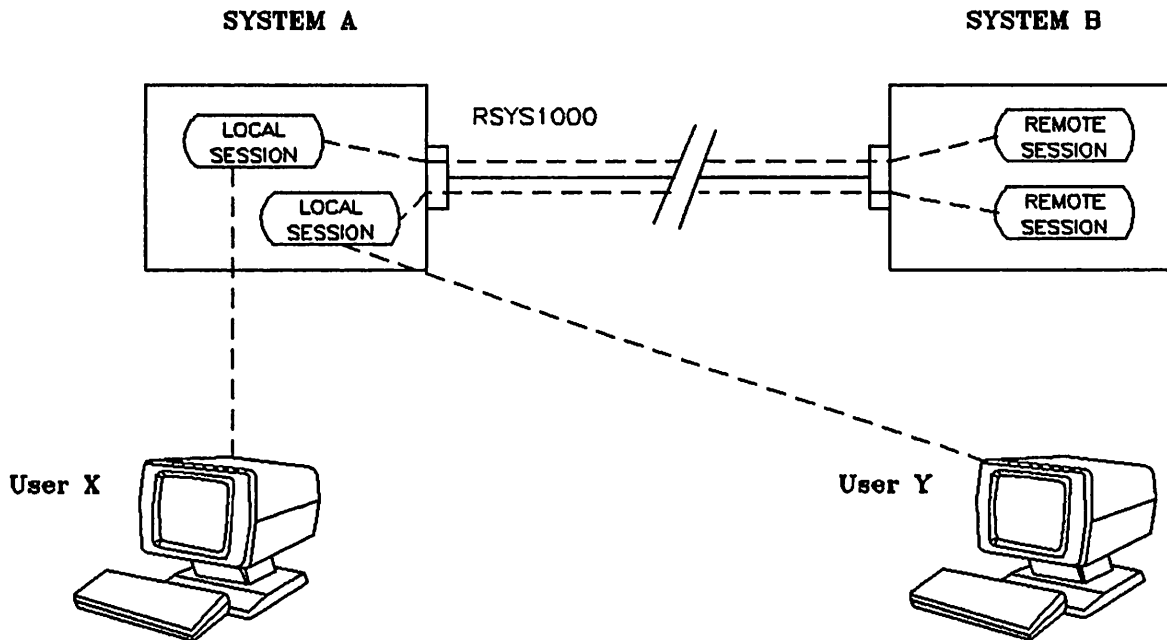


Figure 2-11. Dial-up Line Multiple User Example 3

:HELLO USER.X

:HELLO USER.Y

:DSLIN RSYS1000 ;PHNUM=555-1234

:DSLIN RSYS1000 ;PHNUM=555-1234

:REMOTE HELLO USER.XY

:REMOTE HELLO USER.Y

In this example User X initiates a local session in System A and obtains access to the line identified by the device class name RSYS1000. The supplied telephone number is displayed at the system console of System A. The console operator establishes the telephone connection by dialing the number at the modem connected to the particular line and then enters YES through the system console to let DSN/DS know that the telephone connection was successfully made. No ID sequences are exchanged because none were established (in either computer system) during system configuration and User X didn't specify any in the :DSLIN command. User X then initiates a remote session in System B over the telephone line from his local log-on terminal.

User Y subsequently initiates a local session in System A and requests access to the same line (RSYS1000). Since that line is already open, DSN/DS ignores the supplied telephone number (no message is displayed at the system console). Access to the currently opened line is granted to User Y because neither user requested exclusive access and User Y specified the currently active remote ID sequence (in this case none) in his :DSLIME command.

Note that when no ID sequences are configured and the users don't supply any in their :DSLIME commands, both are taking it on faith that they are connected to the proper remote computer. In this example, if User Y had specified PHNUM=555-2001, DSN/DS would have ignored this telephone number because the line is already open. User Y would have been connected to the currently active remote computer rather than the requested remote system. The total absence of configured or supplied ID sequences is safe only under very controlled circumstances. It is strongly recommended that all computers in a DSN/DS network that are capable of communicating over telephone lines have default local and remote ID sequences established during system configuration and that all line users specify the ID sequence of the desired remote computer (REMIID=x) in their :DSLIME commands.

## Opening Multiple Lines

Within your local session, you can open more than one physical communications line and you can have remote sessions active concurrently over all of the opened lines. However, when operating without DSN/X.25 capability, you are limited to one remote session per physical line at any given time.

If access to the specified line is obtained, DSN/DS responds to each :DSLIME command by displaying a DS line number at your log-on terminal. This line number is roughly analogous to the file number returned by the MPE FOPEN intrinsic, in that it is an arbitrary number that uniquely identifies (within your local session) your current access to a particular communications line. It has no relationship to the logical device number or any other configuration parameter associated with the line. DS line numbers are meaningful only if you have more than one line open concurrently within a single local session. In that case, you are assigned a separate DS line number for each line you have opened, and you subsequently use these numbers to specify which line you wish to use for a given remote command (or sequence of remote commands) or to close a particular line without closing the others.

Figure 2-12 illustrates a situation where a user has established two hardwired communications links concurrently from within a single local session. Take a closer look at that situation and examine the sequence of commands that was used to create it.

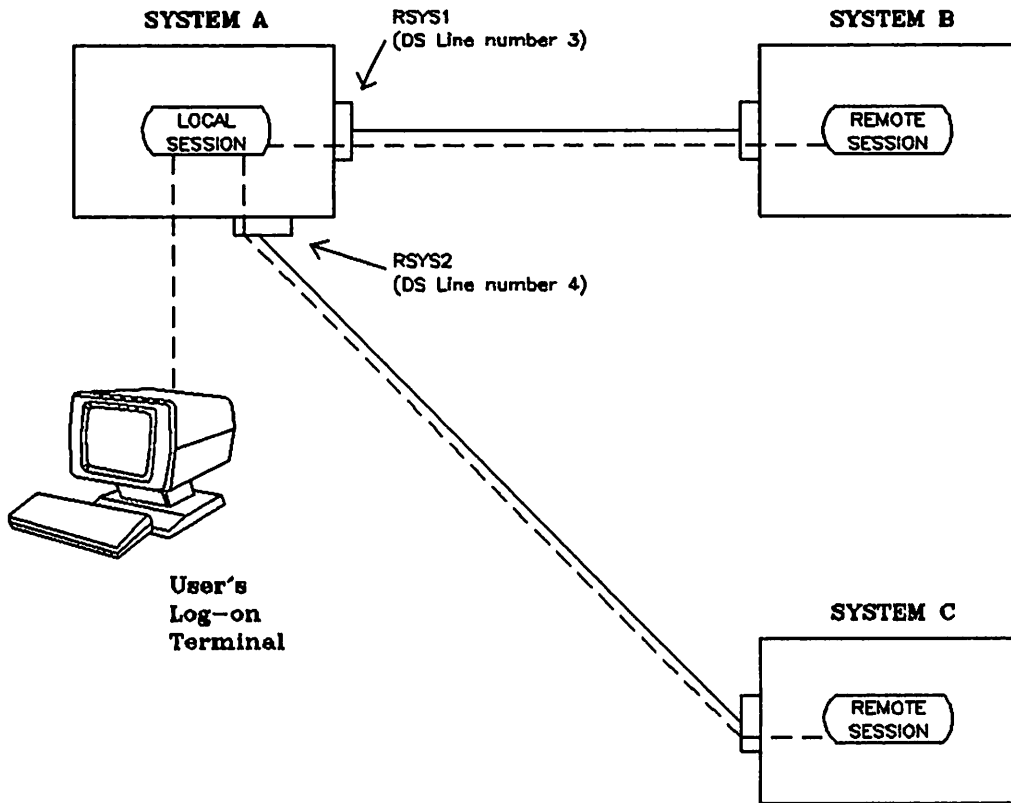


Figure 2-12. Multiple Line Example (Hardwired Lines)

First, the user sat down at a terminal connected to System A and initiated a local session:

```
:HELLO USER.ACCOUNT
```

```
HP3000 / MPE IV C.00.04. WED, MAR 3, 1982, 1:37 PM
```

```
WELCOME TO SYSTEM A.
```

```
:
```

USER and ACCOUNT are valid user and account names, respectively as defined by the accounting structure of System A.

Now, we have the situation illustrated in Figure 2-13. Notice that, at this point, no communications link exists between any of the three systems.

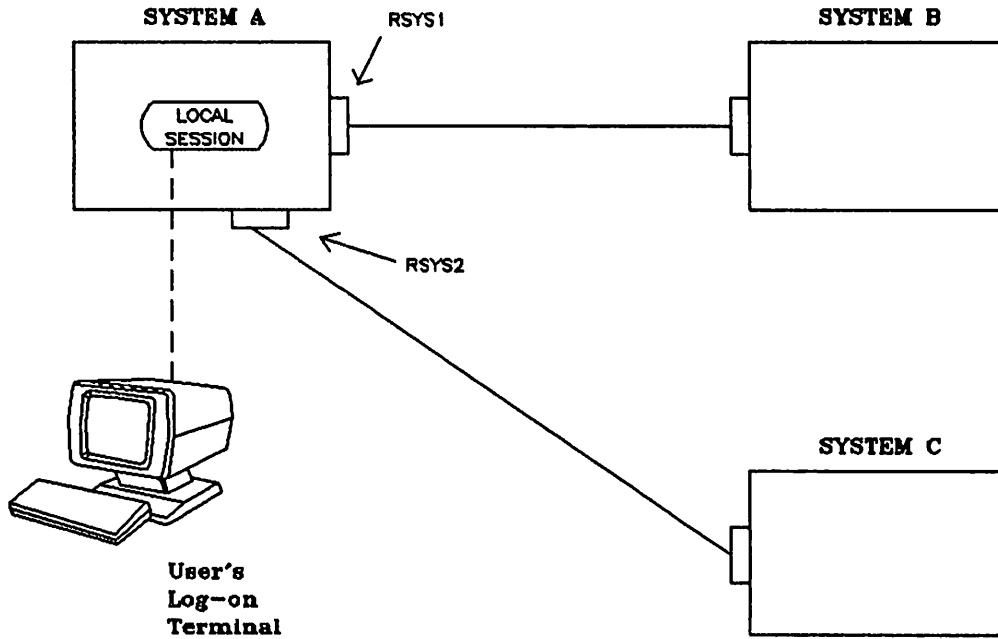


Figure 2-13. Initiating the Local Session  
(Hardwired Example)

## The Communications Link

Next, the user acquired access to a line between Systems A and B.

```
:DSLLINE RSYS1
```

```
DSL
```

LINE NUMBER = #L3

```
:
```

RSYS1 is the device class name (as defined within System A) associated with the particular line.

Now we have the situation illustrated in Figure 2-14.

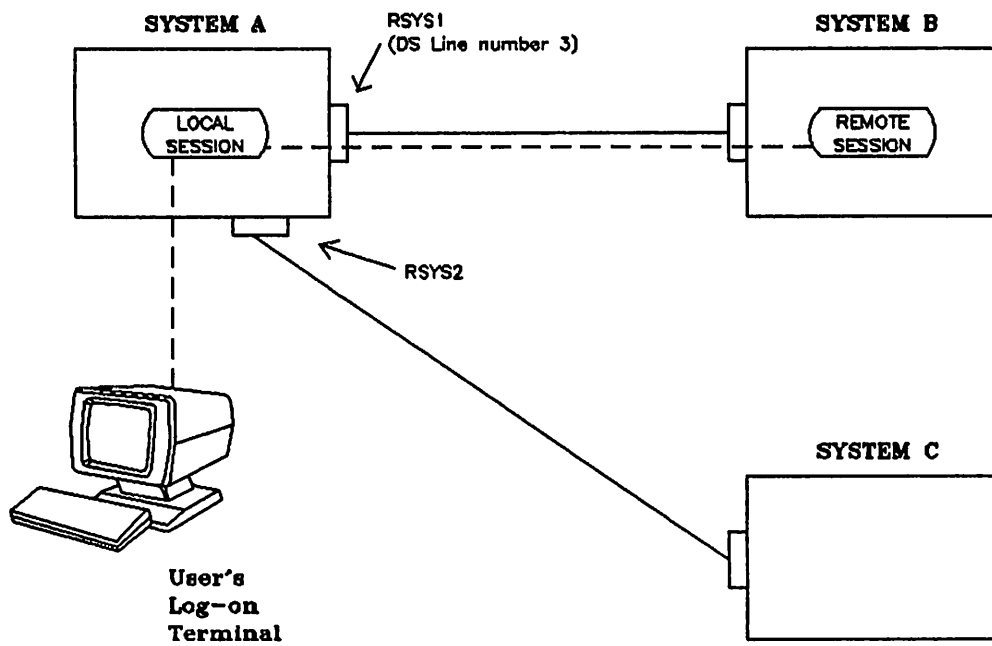


Figure 2-14. Establishing the Link With System B  
(Hardwired Example)

Finally, the user acquired access to a line between Systems A and C:

```
:DSLINE RSYS2
```

```
DS LINE NUMBER = #L4
```

RSYS2 is the device class name (as defined within System A) associated with the particular line.

We end up with the situation illustrated in Figure 2-15, which is identical to Figure 2-12 that started this example.

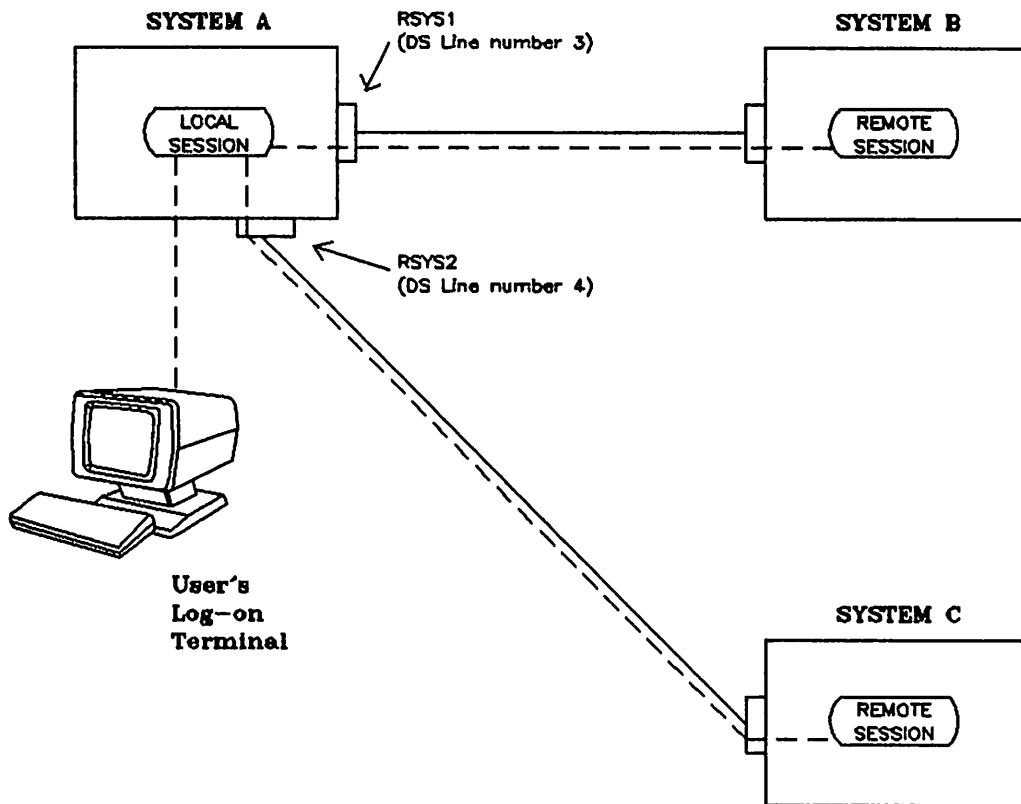


Figure 2-15. Establishing the Link With System C (Hardwired Example)

## The Communications Link

Figure 2-16 illustrates a situation where a user has established two telephone communications links concurrently from within a single local session. Take a closer look at that situation and examine the sequence of commands that was used to create it.

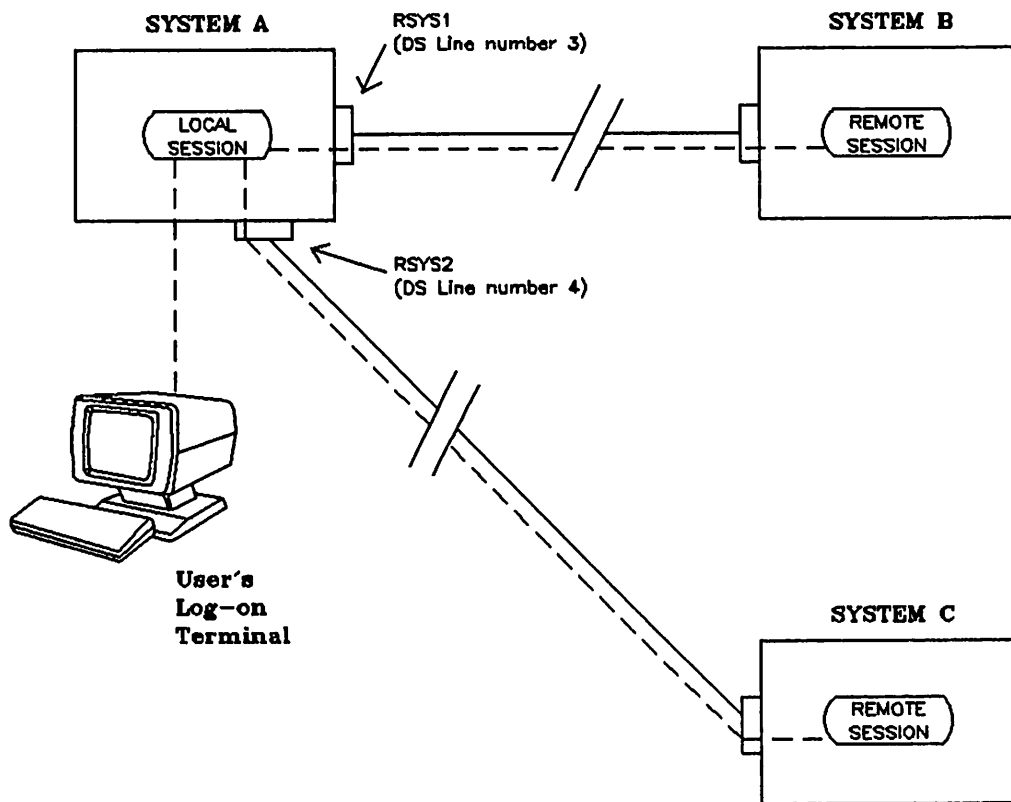


Figure 2-16. Multiple Line Example (Telephone Lines)

First, the user sat down at a terminal connected to System A and initiated a local session:

:HELLO USER.ACCOUNT

HP3000 / MPE IV C.00.04. WED, MAR 3, 1982, 1:37 PM

WELCOME TO SYSTEM A.

:

USER and ACCOUNT are valid user and account names, respectively as defined by the accounting structure of System A.

At this point, we have the situation illustrated in Figure 2-17. Notice that, so far, no communications link exists between any of the three systems.

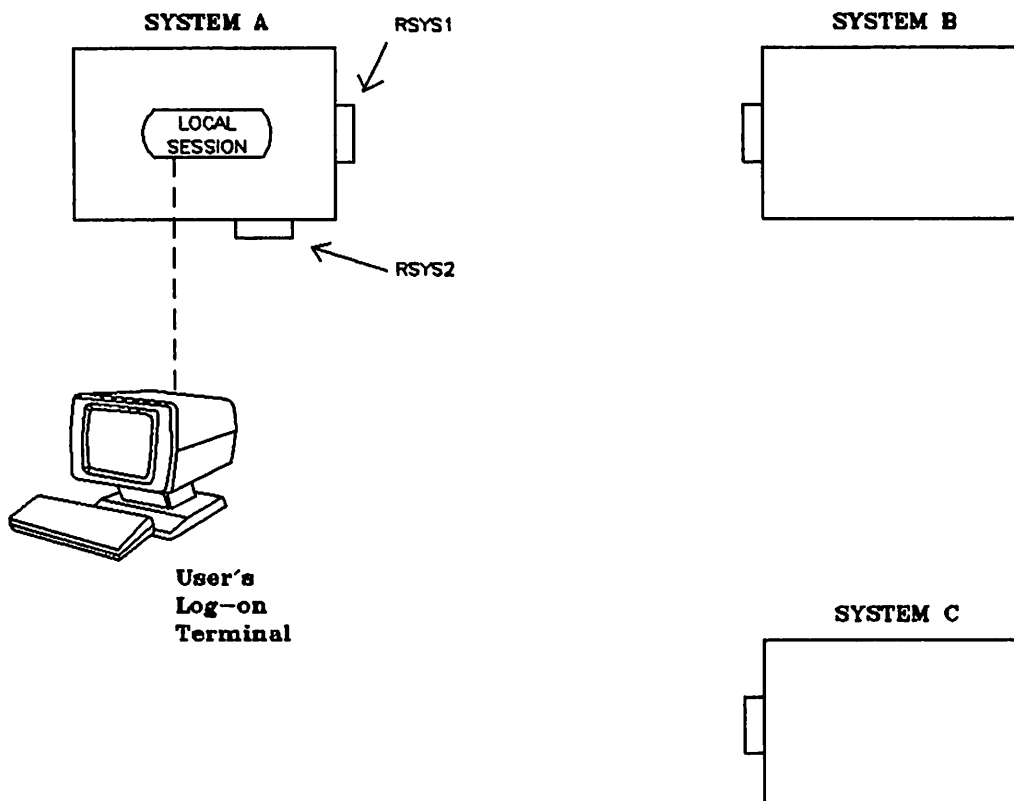


Figure 2-17. Initiating the Local Session  
(Dial-up Example)



## The Communications Link

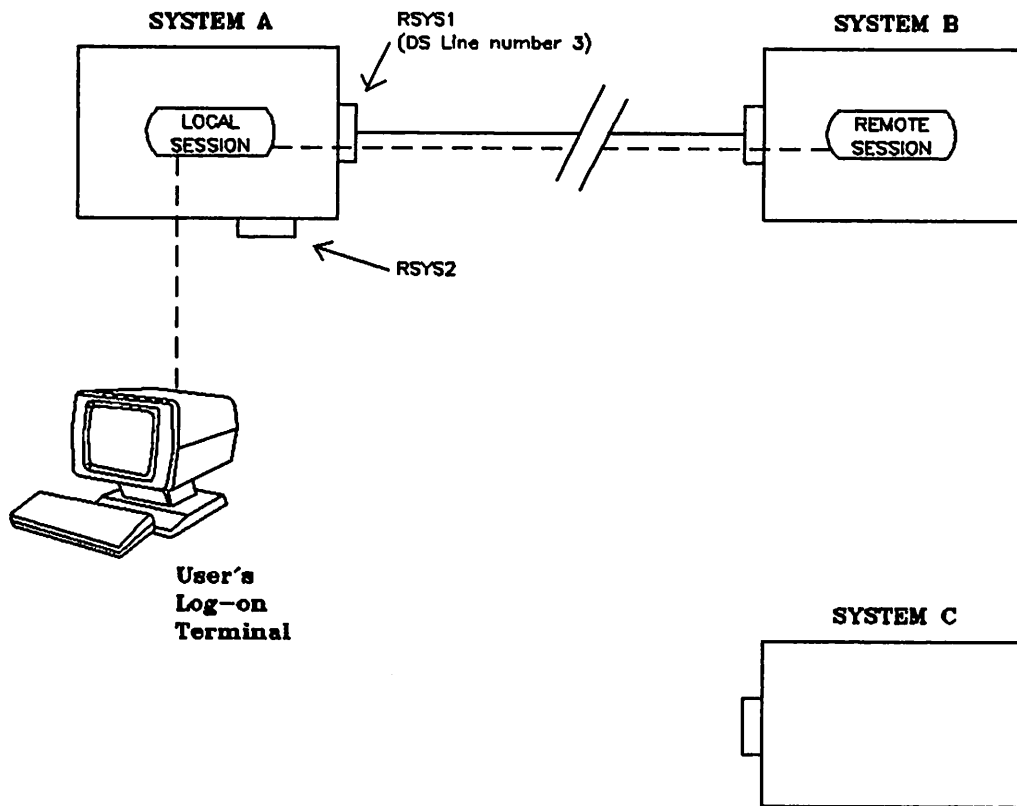
Next, the user acquired access to a telephone connection between Systems A and B.

```
:DSLIN RSYS1 ;LOCID="A" ;REMID="B" ;PHNUM=257-8001
```

```
DS LINE NUMBER = #L3
```

RSYS1 is the device class name (as defined within System A) associated with the particular line, A and B are the ID sequences identifying Systems A and B, respectively, and 257-8001 is the telephone number of the modem connected to the communications interface at System B.

Now we have the situation illustrated in Figure 2-18.



**Figure 2-18. Establishing the Link With System B  
(Dial-up Example)**

Finally, the user acquired access to a line between Systems A and C:

```
:DSLLINE RSYS2 ;LOCID="A" ;REMID="C" ;PHNUM=377-2000
```

```
DS LINE NUMBER = #L4
```

RSYS2 is the device class name (as defined within System A) associated with the particular line, A and C are the ID sequences identifying Systems A and C, respectively, and 377-2000 is the telephone number of the modem connected to the communications interface at System C.

We end up with the situation illustrated in Figure 2-19, which is identical to Figure 2-16 that started this example.

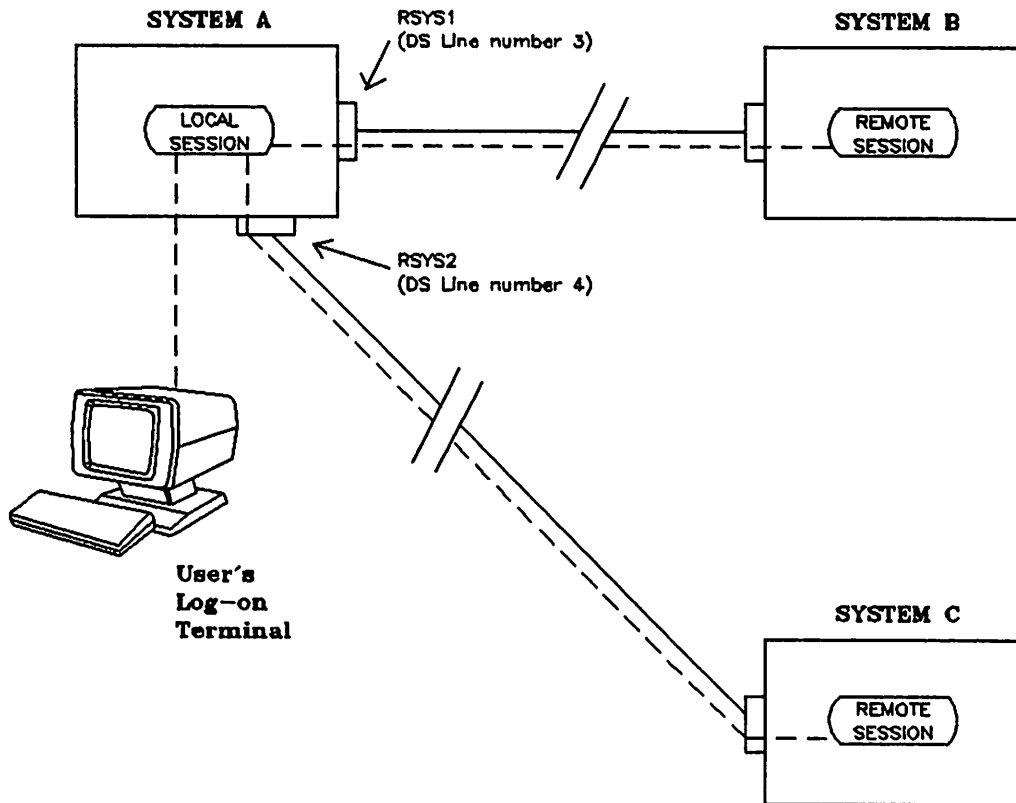


Figure 2-19. Establishing the Link With System C  
(Dial-up Example)

## Line Opening Failures

There are several reasons why a `:DSL` command for opening a communications line might be rejected by DSN/DS, some of which have already been illustrated earlier in this section. If the `:DSL` command is not executed successfully, the error message may help identify the difficulty. The various error numbers and messages that might appear as a result of line opening failures are included in the summary of error codes and messages in Appendix A.

The following list summarizes some likely causes of a line opening failure that are common to hardwired lines, leased lines, and dial-up telephone lines:

- You made a syntax error in the `:DSL` command.
- You gave an erroneous line specification (`dsdevice`) in the `:DSL` command. (There is no `IODS0` or `IODSX` entry in the system configuration with the specified device class name or logical device number.)
- The line was not opened by the local console operator.
- The line was not opened by the remote console operator.
- Someone already has exclusive access to the specified line.
- You asked for `EXCLUSIVE` access to a line which was already in use.
- DSN/DS detected a hardware problem (the communications interface board is not responding correctly).

The following list summarizes the additional causes of a line opening failure on a dial-up telephone line:

- The operator was not able to make the requested telephone connection and entered `NO` through the system console in response to the dial request message.
- The remote computer rejected your local ID sequence.
- The remote computer did not send a valid ID sequence (the received ID sequence did not match any of the remote ID sequences that you specified or, if you didn't specify any, did not match any of the configured remote ID sequences).
- The specified line is already in use and the remote ID sequence you supplied did not match the one used by the currently connected remote HP 1000.

Things to consider if you have experienced a line opening failure:

- Ensure `:DSCONTROL ldev, OPEN` was accomplished.
- Ensure `:RU, DINIT` has been executed on the RTE system. And, if `:DSCONTROL ldev, OPEN` was previously done, the:

## &lt;&lt; HP 3000 COMMUNICATIONS LINK UP &gt;&gt;

message will be displayed on the HP 1000 system console (displayed only if an HSI interface card is used).

- If previous line activity resulted in an error do :DSLLINE *ldev*;CLOSE and then try again to open the line with a :DSLLINE *ldev*.
- In case of continuing problems consider any of the following:
  - Enabling the line from the HP 1000 by :RU,DSMOD and using the /L command to re-enable the communication link used to communicate with the 3000.
  - Try to establish a remote session from the HP 1000 to the HP 3000 instead with:

```
:RU,RMOTE
#HELLO...
```

- Try to reenab DSN/DS on the HP 3000 by ending the local session with a BYE command and then at the console enter:

```
:DSCONTROL ldev,SHUT
:DSCONTROL ldev,OPEN
```

Next, establish a new local session at the HP 3000 with the HELLO command.

The :DSCONTROL *ldev*,OPEN allocates the software and establishes the logical links between software modules.

On the HP 1000, after the DINIT program is executed, an initialization message is sent establishing the buffer size. The initialization reply from the HP 3000 results in satisfactory completion, and a printing of the message (displayed only if an HSI interface card is used):

&lt;&lt; HP 3000 COMMUNICATIONS LINK UP &gt;&gt;

## CLOSING A LINE

Once you have opened one or more communications lines, you can close any or all of them by using a variation of the :DSLIME command. The line closing format of the :DSLIME command is presented here.

### Syntax

```
:DSLIME {dsdevice  
         ds-line-number};CLOSE  
         @
```

### Parameters

*dsdevice* (Optional). The device class name, logical device number, or logical node name specified in the :DSLIME command that opened a particular line.

*ds-line-number* (Optional) The DS line number assigned to you by DSN/DS when the particular line was opened. When this parameter is used, it must appear in the format #Ln, where n is the line number (see "Examples" on the following page).

@ (Optional). This parameter specifies that you wish to close all of the lines that you currently have open.

;CLOSE (Required). This parameter specifies that you wish to close the specified line(s).

If no line identifier (*dsdevice*, *ds-line-number*, or @) is specified, DSN/DS closes the line that you most recently opened.

### Examples

The following examples illustrate the variations of the :DSLIME command that can be used for closing one or more communications lines.

```
:DSLIME RSYS1000 ;CLOSE
```

This form closes the line that is identified by the device class name RSYS1000.

**:DSLIN 55;CLOSE**

This form closes the line that is identified by the logical device number 55.

**:DSLIN @;CLOSE**

This form closes all the lines that you currently have open.

**:DSLIN #L3;CLOSE**

This form closes the line that is identified by #L3.

**:DSLIN;CLOSE**

This form closes the line that you most recently opened.

If you are sharing one or more physical communications lines with other users, the above forms of the :DSLIN command close the line(s) for your application only (the other user's applications are not affected).



A communications link exists after you have initiated some activity on the remote HP 1000. If the remote HP 1000 system allows session access, the DSN/DS software establishes a remote session using the RUSER.RGROUP specified in the REMOTE HELLO or uses the default username and groupname specified in the HP 1000 DINIT answer file.

## NOTE

If your system does not support session access (HP 1000 A Series running RTE-A), you have access to *all* system files on the 1000. A REMOTE HELLO is not possible. The term *session* is applied rather loosely in this section to differentiate between work done on the local system and work done on the remote system (as in *local session* versus *remote session*).

You now have two distinct sessions in existence simultaneously from the same log-on terminal: a local session (in the HP 3000 to which you first logged on) and a remote session (at the HP 1000 at the other end of the communications line). Now pause for a moment to see what this implies.

Within the local session, you have access to all I/O devices and disc files in your local HP 3000 (subject to the usual MPE file security, of course). This is a normal MPE interactive session in every respect. You enter MPE commands and use the various language and utility subsystems exactly as you would if DSN/DS were not present. This local session is running under the username, accountname, and groupname specified in the :HELLO command that you used to first log on. All user capabilities and file access available to you within the local session are determined by those log-on parameters.

With remote processing, you have access to the RTE operating system in the remote HP 1000 by entering RTE operator system commands exactly as you would if you were operating at the HP 1000 and the communications link were not present. The RTE operator commands are executed in the remote HP 1000, however, the output resulting from the executed commands appears at your log-on terminal.

## NOTE

Only RTE system commands can be executed. There is no copy of FMGR for your session.

For the sake of clarity and as a learning aid, the remainder of this section will treat local and remote sessions as separate (and essentially unrelated) entities that use only those resources available in the particular system in which they are running. Actually, it is possible to access the I/O devices and disc files of the remote HP 1000 computer from your local session. This more advanced activity will be covered in Section 4, "Executing Remote EXEC Calls," and Section 5, "Remote File Access."



## ISSUING REMOTE COMMANDS

Remember that, in the previous sections, the following sequence of commands was used to establish the communications link:

```
RETURN  
:HELLO USER.ACCOUNT  
  
HP3000 / MPE IV C.00.04. WED, MAR 3, 1982, 9:05 AM  
  
WELCOME TO SYSTEM A.  
:DSLLINE RSYS1000  
DS LINE NUMBER = #L3  
:
```

At this point, the remote session has not been initiated; you are currently in the local session (as signified by the colon prompt character). To establish a remote session and execute a remote command, use the following construct:

```
:REMOTE [xxxx] command
```

where *xxxx* is the DS line number returned by DSN/DS when the communications line was opened, and *command* is the desired RTE command in its normal format. The DS line number is necessary only if you have more than one communications line open simultaneously; if it is omitted, then the line which you most recently opened is referenced by default. The HP 1000 operator command sent to the remote processor must follow the command syntax of the remote processor verbatim, and the first character must not be a numeric or a comma. Since different versions of RTE support different operator commands, consult the documentation provided with your RTE system to determine the exact format of your RTE commands.

In the example in Section 1, the following construct was used to execute a TI command:

```
:REMOTE TI  
  
1983 249 8 39 3  
  
:
```

Because the prefix REMOTE was included, the TI command is executed in the remote session. Although the TI command is executed in the remote HP 1000, the output generated by the command is displayed at your local log-on terminal.

Notice, in the above example, that the DS line number associated with the particular communications line was not specified (3 in this example). This is because, if no line number is specified, DSN/DS uses (by default) the line most recently opened. Only one communications line is open from your local session; so DSN/DS uses that line by default. If you had opened a second line, you would need to tell DSN/DS in which remote computer the remote command is to be executed. To tell DSN/DS, include the appropriate DS line number in the remote command, as follows:

```
:REMOTE 3 TI
```

```
1983 249 8 39 3
```

```
:
```

The above construct only allows you to execute a single remote command. After the remote command has been executed, control returns to your local session, as signified by the colon prompt character.

But suppose that you want to execute a whole series of remote commands. It would obviously be a nuisance to have to prefix each command with the word REMOTE. DSN/DS provides a convenient solution to this situation. To execute a series of commands in the remote session, use the following construct:

```
:REMOTE [xxx]
```

where *xxx* is again the DS line number of the desired communications line (specifying in which remote HP 1000 we want to execute commands). DSN/DS then prompts you for each command by displaying a # prompt in column 1 of your terminal (in place of the standard MPE colon prompt). In the example in Section 1, this construct was used for entering two remote RTE commands, EQ and UP.

After reviewing the example in Section 1, try this example:

```
:REMOTE  
#LU,1
```

```
LU #1 = E2  
#EQ,2
```

```
16 DVR00 0 B U 0 0  
#:  
:
```

Notice that except for the # prompt (in place of the standard colon prompt) this looks exactly like a normal RTE operator's session. All of the commands shown in the previous example are entered through the local log-on terminal, but the RTE operator commands are executed in the remote session within the remote HP 1000. After each remote RTE command was executed, however, control remained in the remote session (as signified by the # prompt character). When the user typed a colon (:) in response to the # prompt, control was then returned to the local session (as signified by the colon prompt). The remote session is terminated when the :DSLIN command is executed with the CLOSE parameter.

## Executable RTE Operator Commands

While in a remote process on the HP 1000 system, you can use the RTE operator commands listed below:

AB	Abort current batch program
BL	Set buffer limits
BR	Set break flag in the ID segment of the named program
DN	Declare I/O device unavailable
EQ	Examine status of I/O device
GO	Restart program out of suspension
IT	Set time intervals for programs
LU	Examine or alter device logical unit assignments
OF	Abort a program
ON	Schedule a program
PR	Change priority of programs
PS	Program status (L, XL, A)
RU	Start a program immediately
RT	Release disc tracks of a program
SS	Suspend programs
ST	Examine the status of programs
TI	Display the current time (IVB, 6/VM)
TM	Display the current time (L, XL, A)
TO	Examine or alter time-out parameter of an I/O device
UP	Declare I/O device available
IO	Examine I/O configuration (L, XL, A)

<b>NOTE</b>
-------------

Extreme care should be taken in modifying the RTE real-time clock since some programs, including Distributed System software, are scheduled at specific times.

Syntax and further descriptions of these commands are included in the *RTE Programmer's Reference Manual* for each system.

## Using the Remote Subsystem from a Batch Job

While in a batch job, you can establish a remote session by using the :DSLIN command.

The job to be streamed may be similar to the following:

```
:JOB USER.ACCOUNT
:DSLIME RSYS1000
:REMOTE HELLO RUSER.RACCOUNT
:REMOTE
#DN,6
#TO,6,500
#UP,6
#:
:REMOTE BYE
:DSLIME;CLOSE
:EOJ
```

<b>NOTE</b>
-------------

The remote # prompt is optional.

An important point to remember is that, once established, the remote session is interacting with the job in the same way as it would interact with a terminal. If the remote session detects an error, the error is printed to \$STDLIST. If the error generates a user prompt, the next record in the job file is read as the response (in the same manner as waiting for a character or carriage return on a terminal). The record is then lost to the job.

## ISSUING LOCAL COMMANDS

Whenever the standard MPE colon prompt is displayed at your terminal, you are in the local session. Within the local session, you enter MPE commands in their normal format in response to the colon prompt. If you are in the midst of a remote session (that is, you used the command :REMOTE, and DSN/DS is issuing the # prompt character), you can return control to your local session by entering a colon, as follows:

```
#:
:
```

In response to the remote colon, control returns to the MPE Command Interpreter of your local HP 3000 which then prompts you for local commands with the colon prompt character. Note that the remote colon does not terminate the remote session; you can resume processing in the remote session by again using either of the constructs described under "Issuing Remote Commands".

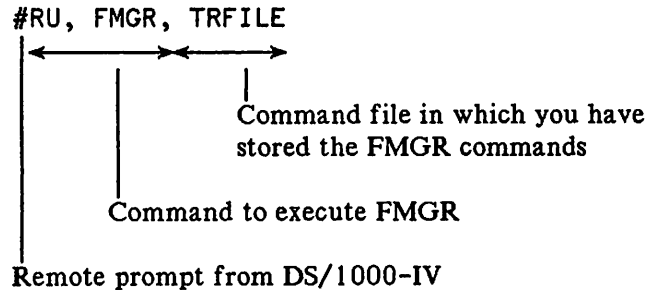
## TERMINATING A REMOTE SESSION

To terminate the remote HP 1000 session, issue the :REMOTE BYE command, or :DSLIME;CLOSE. In the latter case, DSN/DS/1000-IV automatically terminates the HP 1000 session.

## LIMITATIONS

There are certain limitations when you attempt to access the following RTE subsystems interactively:

- The Editor. You are unable to edit a file. This is a subsystem that runs under the RTE operating system, and there is no facility to direct the dialogue back to the HP 3000 computer.
- The File Management Program (FMGR). You are unable to run the FMGR control program directly with output to an HP 3000 terminal. You may create a transfer file containing the FMGR operator commands. Then you may run FMGR, specifying the file as follows:



Output from the File Manager subsystem can not be routed over the communications link back to the HP 3000. Instead, all output is directed to LU1.

### CAUTION

The request to RU,FMGR causes the actual FMGR program to run (not a copy of it). This will tie up FMGR until the transfer file has completed, and keep other users on the HP 1000 from logging on (they will not be able to get a copy of FMGR for their session). You must also be very careful to EX,SP from FMGR at the end of the transfer file or FMGR will be tied up to your session until you terminate it (BYE), or it times out. Exercise caution when running FMGR from the HP 3000.

# EXECUTING REMOTE EXEC CALLS

SECTION

4

In the RTE operating system environment, EXEC calls are used by programs to interact with the system executive. DEXEC calls are the remote processing equivalent to the RTE EXEC calls, allowing you to interface with remote systems programmatically. A call to DEXEC will be processed by the EXEC module of the remote RTE operating system.

By using DEXEC calls you can direct the RTE System Executive program to:

- Read from or write to a remote I/O device (excluding a DISC device).
- Perform I/O operations on remote I/O devices (excluding a DISC device).
- Schedule dormant remote programs for execution.
- Obtain the current time from the remote real-time clock.
- Schedule remote programs for a set time of execution.
- Obtain status information about a remote I/O device.

These calls are summarized in Table 4-1, which lists each DEXEC call with its instruction code and the function performed. For further information on DEXEC calls, you may want to refer to the appropriate *RTE Programmer's Reference Manual* which contains information on the nearly identical EXEC calls.

The programmatic DEXEC calls described in this section can be used from an HP 3000 to an HP 1000. Prior to their use, the following commands must first be executed:

:DSCONTROL *ldev*;OPEN

Console command on HP 3000 to enable DSN/DS 3000.

:RU,DINIT

On the HP 1000 to schedule various monitors and to enable the line.

:DSLIN *ldev*

In session on the HP 3000 to request the logical use of a DS line to the HP 1000.

Table 4-1. DEXEC Calls

Instruction code	Call	Function
1	READ	Reads a record from a remote I/O non-disc device.
2	WRITE	Writes a record on a remote I/O non-disc device.
3	I/O CONTROL	Performs an I/O control operation on a remote I/O device.
10	PROGRAM SCHEDULE	Schedules dormant remote programs for execution.
11	TIME REQUEST	Obtains the current time from the remote real-time clock.
12	TIMED PROGRAM SCHEDULE	Schedules remote programs for a set time of execution.
13	I/O STATUS	Obtains I/O status information from a remote I/O device.

## DEXEC CALL ELEMENTS

EXEC calls and DEXEC calls are comparable in certain aspects such as parameter placement and meaning and the values returned in ABREG. DEXEC calls do have one additional parameter than EXEC calls. This is the destination parameter, named *IDEST*. The *IDEST* parameter is a five word integer array which contains the device class name or logical device number of the DS device and the DS line number. A complete description of *IDEST* appears for each of the calls in this section.

### NOTE

In the discussion of each DEXEC call which follows in this section, you may be asked to refer to the *RTE Programmer's Reference Manual* appropriate for your HP 1000 system for RTE specific details. You may find that the names of the parameters for each call vary slightly depending on which RTE manual you reference.

The format of a typical DEXEC call appears as follows:

### Syntax

```
ABREG: = DEXEC (IDEST,ICODE,ICNWD,IBUFR,IBUFL[#]IPRM1[#]IPRM2[#]);
```

DEXEC call formats described in this section include superscripts that describe the types of parameters and whether they must be passed by value instead of by reference. The superscripts have the following meanings:

BA	byte array
BP	byte pointer
D	double word, by reference
DA	double word array
DV	double word, by value
I	integer by reference
IA	integer array
IV	integer by value
L	logical by reference
LA	logical array
LV	logical by value
O-V	option variable
R	real by reference

The superscript O-V is shown for some DEXEC calls to denote an option variable, meaning that the DEXEC call contains optional parameters.



## Functional Return

The information returned in the A-register and B-register by DEXEC is the same as that returned by EXEC (refer to the appropriate Operating System reference manual) with additional DS/1000-IV error conditions and codes. The values of the A- and B-registers are returned immediately after the EXEC call is made on behalf of the program on the HP 3000. Applicable DEXEC error codes are listed in Appendix A of this manual.

The following describes the possible outcomes :

- CCL(<) Error detected by the HP 3000. The binary code in ABREG may contain a DEXEC, DS, or MPE file system error code.
- CCG(>) Completed at communications level, but the HP 1000 detected an error. A four character ASCII DEXEC error code is in ABREG.
- CCE(=) The call was completed successfully. Registers contain status information, not error information.

## Error Checking Routine Example

The following example shows how to check for the failure of a DEXEC call. This example comes from a complete programming example that appears at the end of this section. You will need to refer to the complete programming example for the definition of the variables.

```
PROCEDURE ERROR(CC,QUITNO);
VALUE CC,QUITNO;
INTEGER CC,QUITNO;

BEGIN
  IF CC=-1 THEN                                <<DEXEC RETURNED CCL>>
    BEGIN
      MOVE MSG:="** HP 3000 DEXEC ERROR: ";
      ASCII(ABREG(1),10,MSG(24));
      PRINT(MSGW,-25,0);
    END
  ELSE IF CC=1 THEN                             <<DEXEC RETURNED CCG>>
    BEGIN
      MOVE MSG:="** HP 1000 DEXEC ERROR: ";
      MOVE MSGW(12):=ABREG,(2);
      PRINT(MSGW,14,0);
    END;
  QUIT(QUITNO);
END;
```

**NOTE**

For detailed information about DEXEC calls, refer to the *DS/1000-IV User's Manual* and the EXEC call section of the *RTE Programmer's Reference Manual* appropriate for your system.

# READ

The read call, instruction code 1, transfers information from a remote I/O device to a local user buffer.

## Syntax

```
      D      LA  IV  I  IA  I  I  I  I  0-V
ABREG: = DEXEC (IDEST,ICODE,ICNWD,IBUFR,IBUFL[IPRM1][IPRM2]);
```

## Functional Return

Upon completion of the call, a doubleword ABREG is returned. Word 1, displayed in the A-register, contains status information, the equipment type code, and an availability indicator. Word 2, displayed in the B-register, shows the positive number of words or characters actually read, depending on how IBUFL was specified in the procedure call (+ for words, - for characters). Refer to the appropriate RTE Programmer's Reference Manual for details.

## Parameters

- IDEST** Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE** Integer by value (required). Specifies the instruction code, which is 1 for a read call.
- ICNWD** Integer by reference (required). The control word is an integer which specifies the logical control unit of the remote input device and other control information required by RTE.
- IBUFR** Integer array (required). An array that will contain the information read from the device. You must insure the buffer is large enough to hold the amount of data specified by IBUFL.
- IBUFL** Integer by reference (required). An integer specifying the number of words or characters to be read. If this value is positive it signifies the length in words; if it is negative it signifies the length in characters. The maximum buffer size for DEXEC requests is 512 words (1024 characters).
- IPRM1 and IPRM2** Integer by reference (optional). Integer parameters which may be optional, depending on the input device. Unlike a local RTE EXEC call, these parameters cannot be used to pass additional buffers.

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE            Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
- CCL            Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
- CCG            Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# WRITE

The write call, instruction code 2, transfers information from a local user buffer to a remote I/O device.

## Syntax

D		LA	IV	I	IA	I	I	I	I	0-V
ABREG: = DEXEC (IDEST, ICODE, ICNWD, IBUFR, IBUFL [IPRM1] [IPRM2]);										

## Functional Return

Upon completion of the call, a doubleword ABREG is returned. Word 1, displayed in the A-register, contains status information, the equipment type code, and an availability indicator. Word 2, displayed in the B-register, shows the positive number of words or characters actually read, depending on how *IBUFL* was specified in the procedure call (+ for words, - for characters). Refer to the appropriate *RTE Programmer's Reference Manual* for details.

## Parameters

- IDEST* Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE* Integer by value (required). The instruction code is 2 for a write call.
- ICNWD* Integer by reference (required). The control word is an integer which specifies the logical control unit of the remote input device and other control information required by RTE.
- IBUFR* Integer array (required). An array that will contain the information read from the device. You must insure the buffer is large enough to hold the amount of data specified by *IBUFL*.
- IBUFL* Integer by reference (required). An integer specifying the number of words or characters to be read. If this value is positive it signifies the length in words; if it is negative it signifies the length in characters. The maximum buffer size for DEXEC requests is 512 words (1024 characters).
- IPRM1* and *IPRM2* Integer by reference (optional). Integer parameters which may be optional, depending on the input device. Unlike a local RTE EXEC call, these parameters cannot be used to pass additional buffers.

## **Error Conditions**

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE**            Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
  
- CCL**            Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
  
- CCG**            Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# I/O CONTROL

The I/O control call, instruction code 3, carries out various operations such as backspace, rewind, and end of file, on a remote I/O device.

## Syntax

```
      D          LA  IV  I   I   0-V  
ABREG: = DEXEC (IDEST,ICODE,ICNWD[IPRM1]);
```

## Functional Return

The call returns the A-register and B-register in a double word. The A-Register contains the status of the device and EQT word 5. The B-Register has no meaning. Refer to the appropriate *RTE Programmer's Reference Manual* for details.

## Parameters

- IDEST* Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE* Integer by value (required). The instruction code is 3 for an I/O control call.
- ICNWD* Integer by reference (required). The control word is an integer which specifies the logical unit of the remote I/O device and other control information information required by RTE.
- IPRM1* Integer by reference (optional). An optional parameter which is required for list output line spacing and various other functions.

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE* Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
- CCL* Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
- CCG* Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# PROGRAM SCHEDULE

The remote program schedule call, instruction code 10, designates a dormant remote program for execution at the remote system and optionally transfers up to five parameters to the program.

## Syntax

```

      D      LA  IV  IA  I  I  I
ABREG: = DEXEC (IDEST, ICODE, INAME [IPRM1] [IPRM2] [IPRM3]
              [IPRM4] [IPRM5]);
              I  I  O-V

```

## Functional Return

If the program to be scheduled is dormant, it is scheduled by this call and a zero is returned to the calling program in the A-Register.

If the program to be scheduled is not dormant, it is not scheduled by this call and its status, which is some non-zero value, is returned to the calling program in the A-Register.

A-register:	Meaning:
0	Good return.
1	Program already scheduled.
2	I/O suspend.
3	Program in wait state.
4	Unavailable memory suspend.
5	Disc allocation suspend.
6	Operator suspend, or program suspend.

## Parameters

- IDEST* Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE* Integer by value (required). The instruction code is 10 for a program schedule call.
- INAME* Integer array (required). A five character name array of the program to schedule.
- IPRM1 - IPRM5* Integer by reference (optional). Up to five integer parameters to be passed to the scheduled program.



# PROGRAM SCHEDULE

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE            Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
- CCL            Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
- CCG            Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# TIME REQUEST

The time request call, instruction code 11, obtains the current time from the remote real-time clock and returns it to your terminal.

## Syntax

```
D          LA   IV   IA
ABREG: = DEXEC (IDEST,ICODE[ITIME]);
```

## Parameters

- IDEST** Logical array (required). A five word array that contains, in its first four words an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE** Integer by value (required). The instruction code is 11 for a time request call.
- ITIME** Integer array (required). A five word array in which the current time is returned.
- ITIME* (1) = tens of milliseconds  
*ITIME* (2) = seconds  
*ITIME* (3) = minutes  
*ITIME* (4) = hours  
*ITIME* (5) = day of year (Julian)

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE** Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
- CCL** Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
- CCG** Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# TIMED PROGRAM SCHEDULE (Initial Offset)

The remote timed program schedule call, instruction code 12, schedules a remote program for execution at specified time intervals, starting after an initial offset time. The requested program is placed in the time list.

## Syntax

```
D          LA  IV  IA  I  I  I
ABREG: = DEXEC (IDEST,ICODE,INAME,IRESL,MPTLE,IOFST);
```

## Parameters

- IDEST** Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
- ICODE** Integer by value (required). The instruction code is 12 for a remote timed program schedule call.
- INAME** Integer array (required). A three word integer array which names the remote program to put in the time list.
- IRESL** Integer by reference (required). The value of resolution represents the units of time which, when used with the *MPTLE* value, result in the total time intervals. Values for the resolution code are:
- 1 = tens of milliseconds
  - 2 = seconds
  - 3 = minutes
  - 4 = hours
- MPTLE** Integer by reference (required). Multiple is a number from 0 to 4095 which is used with *IRESL* to give the actual time interval for scheduling. For example, if *MPTLE* is set to 3 and *IRESL* is 2, the program will be scheduled every 3 seconds after an initial offset of *IOFST* seconds. If the parameter *MPTLE* is set to zero, the program is run only once.
- IOFST** Integer by reference (required). *IOFST* is used with the value of *IRESL* to define the initial time offset. It is a negative value representing the amount of time to wait before running the program for the first time.

# TIMED PROGRAM SCHEDULE (Initial Offset)

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

- CCE**            Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
- CCL**            Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
- CCG**            Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# I/O STATUS

The I/O status call, instruction code 13, obtains I/O status information about a remote I/O device.

## Syntax

```
      D      LA  IV  I  L  L      O-V
ABREG: = DEXEC ( IDEST, ICODE, ICNWD, ISTA1 [ ISTA2 ] );
```

## Parameters

<i>IDEST</i>	Logical array (required). A five word array that contains, in its first four words, an ASCII DS device class name or logical device number. The last word is used by the system to store the DS line number.
<i>ICODE</i>	Integer by value (required). The instruction code is 13 for an I/O status call.
<i>ICNWD</i>	Integer by reference (required). The control word is an integer which specifies the logical unit of the remote I/O device and other control information required by RTE.
<i>ISTA1</i>	Logical (required). The status returned for EQT word 5. See the appropriate <i>RTE Programmer's Reference Manual</i> for details.
<i>ISTA2</i>	Logical (optional). The status returned for EQT word 4. See the appropriate <i>RTE Programmer's Reference Manual</i> for details.

## Error Conditions

Each DEXEC call should be followed with a test of the condition code, whose values indicate:

<i>CCE</i>	Satisfactory completion. The ABREG may contain information. Refer to the DEXEC call.
<i>CCL</i>	Error conditions on the HP 3000 end. Refer to Appendix A for DEXEC error codes. The binary value is contained in the ABREG. This value may also represent a DS or MPE file system error.
<i>CCG</i>	Error condition on the HP 1000 end. Refer to Appendix A for DEXEC error codes. The ASCII value is contained in the ABREG.

# PROGRAM EXAMPLE

The following is an SPL program which uses the read and write DEXEC calls and also includes an error checking routine.

```
$CONTROL USLIMIT
BEGIN

COMMENT
  THIS PROGRAM PROMPTS THE USER FOR A MESSAGE TO BE
  WRITTEN TO THE REMOTE HP 1000 CONSOLE, AND THEN
  READS THE REMOTE HP 1000 OPERATOR'S RESPONSE. THE
  RESPONSE IS PRINTED ON THE HP 3000 USER'S TERMINAL;

BYTE ARRAY BBUFFER(0:79);
BYTE ARRAY MSG(0:79);
ARRAY DESTINATION(0:4):="NODE105  ";
ARRAY MSGW(*)=MSG;
INTEGER ARRAY BUFFER(*)=BBUFFER;
DOUBLE ABREG;
INTEGER LGTH;

INTRINSIC PRINT,READ,QUIT,TERMINATE,ASCII,DEXEC;

PROCEDURE ERROR(CC,QUITNO);
VALUE CC,QUITNO;
INTEGER CC,QUITNO;

BEGIN
  IF CC=-1 THEN                                <<DEXEC RETURNED CCL>>
    BEGIN
      MOVE MSG:="** HP 3000 DEXEC ERROR: ";
      ASCII(ABREG(1),10,MSG(24));
      PRINT(MSGW,-25,0);
    END
  ELSE IF CC=1 THEN                             <<DEXEC RETURNED CCG>>
    BEGIN
      MOVE MSG:="** HP 1000 DEXEC ERROR: ";
      MOVE MSGW(12):=ABREG,(2);
      PRINT(MSGW,14,0);
    END;
  QUIT(QUITNO);
END;

LOOP:

<<PROMPT USER FOR MESSAGE TO BE SENT TO REMOTE OPERATOR>>

MOVE MSG:="ENTER MESSAGE FOR HP 1000 OPERATOR: ";
PRINT(MSGW,-36,%320);
LGTH:=READ(BUFFER,-80);
IF (LGTH=0) THEN TERMINATE;
```

## PROGRAM EXAMPLE

<<SEND MESSAGE TO THE HP 1000 SYSTEM CONSOLE>>

```
ABREG:=DEXEC(DESTINATION,2,1,BUFFER,-LGTH);  
IF < THEN ERROR(-1,1)  
    ELSE IF > THEN ERROR(1,2);
```

<<READ REMOTE OPERATOR'S RESPONSE>>

```
ABREG:=DEXEC(DESTINATION,1,1,BUFFER,-80)  
IF < THEN ERROR(-1,3)  
    ELSE IF > THEN ERROR(1,4);  
PRINT(BUFFER,-ABREG(2));  
GO LOOP;  
END.
```

Through the use of the DS/3000 Remote File Access capability, SPL, PASCAL, FORTRAN, or COBOL/II programs running in your local session can access any of the disc files of the remote HP 1000 (which are available to your session) as though they reside at your local HP 3000 site.

## NOTE

RFA calls can only access FMGR files; you cannot access files in the hierarchical file system.

This section discusses how you can use HP 3000 intrinsics to access HP 1000 files using DS.

## PROGRAMMATIC ACCESS

Once a communications link has been established between your HP 3000 and remote HP 1000, you can use the Remote File Access (RFA) intrinsics to access files available to your session which reside at the remote HP 1000 site. Remote File Access provides the means to create, open, read, write, close, and control the files on the remote HP 1000 system.

Table 5-1 lists the Remote File Access intrinsics, the corresponding RTE File Manager (FMP) call, and a corresponding description of each RFA intrinsic call. Refer to the *RTE Programmer's Reference Manual* for further information on FMP calls.

These RFA intrinsics may be used from the HP 3000 to an adjacent HP 1000. Use of these intrinsics requires that the line be opened by the commands:

:DSCONTROL *ldev*;OPEN

Console comand on HP 3000 to enable DS/3000.

:RU,DINIT

On the HP 1000 to schedule various monitors and to enable the line.

:DSLINE *ldev*

In session on HP 3000 to request the logical use of a DS line to the HP 1000.

## NOTE

Multiple processes running under the *same* HP 3000 session cannot access the same HP 1000 file via RFA.

Multiple processes under *separate* HP 3000 sessions may access the same HP 1000 file via RFA.



Table 5-1. RFA and FMP Cross Referencing

RFA	FMP	DESCRIPTION
DAPOS	APOSN	Positions disc files to a record. Record address usually obtained through DLOCF.
DCLOS	CLOSE	Close DCB. Make file available to others. Can also truncate file.
DCONT	FCONT	Perform I/O control function on non-disc device file, a type 0 file.
DCRET	CREAT	Create a file.
DLOCF	LOCF	Return information on opened file.
DNAME	NAMF	Close DCB and rename file.
DOPEN	OPEN	Open file to calling program.
DPOSN	POSNT	Skip records forward or backward.
DPURG	PURGE	Purge file. Cannot be opened.
DREAD	READF	Read a record from a file to a user buffer.
DSTAT	FSTAT	Return status of all mounted cartridges.
DWIND	RWNDF	Rewind type 0 files, including magnetic tape. Set to record 1 in disc file.
DWRIT	WRITF	Write a record from the buffer of a user to file.

## DESCRIPTION OF ERROR CONDITIONS AND PARAMETERS

- CCE** No error with DSN/DS at either end. Check *IERR* for result on the HP 1000. If *IERR* < 0, then there is an FMP error.
- CCL** Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
- CCG** Not used.
- IERR*** Integer (required). The error code returned as a result of remote file access problems.

The following example shows how to check for the failure of an RFA call. The example comes from a complete programming example that appears at the end of this section.

### Error Checking Routine Example

```

PROCEDURE ERRORPROC(CC,QUITNO);
VALUE CC,QUITNO;
INTEGER CC,QUITNO;

BEGIN
  MOVE MSG(0):=" ";
  MOVE MSG(1):=MSG(0),(59);
  IF CC=-1 THEN                                <<RFA RETURNED CCL>>
    BEGIN
      MOVE MSG:="** HP 3000 RFA ERROR: ";
      ASCII(ERROR,10,MSG(22));
      PRINT(MSGI,-25,0);
    END
  ELSE IF CC=0 THEN                            <<RFA RETURNED CCE WITH ERROR>>
    BEGIN
      MOVE MSG:="** HP 1000 RFA ERROR: ";
      ASCII(ERROR,10,MSG(22));
      PRINT(MSGI,-25,0);
    END;
  QUIT(QUITNO);
END;

```

**NOTE**

If the file being accessed at the remote HP 1000 site is particularly large, you may get an error message at the HP 3000 site which indicates a remote reject error. In fact, the problem may be that a time out occurred at the remote HP 1000 site. The HP 3000 does not have an error message to indicate that this is the real problem. You may wish to verify a time out problem by looking at the error message that appears on the HP 1000 system console or simply up the time out specification. Refer to the *DS/1000-IV Network Manager's Manual*, Vol. II for details.

**NOTE**

For detailed information on RFA calls, refer to the *DS/1000-IV User's Manual* and the *RTE Programmer's Reference Manual* appropriate for your system.

Sets the address of the next record for sequential RTE disc file.

## Syntax

```

      LA  I   IV  IV   IV   O-V
DAPOS (IDCB, IERR, IREC[IRB][IOFF]);
    
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a 4-word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error code returned as the result of remote file access.
<i>IREC</i>	Integer by value (required). Record number of the next record in a sequentially numbered file. The first record is numbered starting with 1.
<i>IRB</i>	Integer by value (optional). Relative block number of the block containing the next record, from the DLOCF intrinsic. This parameter must be included for correct operation on files with variable length records.
<i>IOFF</i>	Integer by value (optional). A word offset, within a block, for the beginning of a new record, from DLOCF intrinsic. This parameter must be included for correct operation on files with variable length records.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

<i>CCE</i>	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
<i>CCL</i>	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
<i>CCG</i>	Not used.

# DAPOS

## NOTE

The DAPOS intrinsic allows random access of sequential files.

Closes the DCB and makes the RTE file available to other callers.

## Syntax

```

      LA   I   IV   O-V
DCLOS (IDCB,IERR[ITRUN]);

```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). The error code returned as a result of remote file access.
<i>ITRUN</i>	Integer by value (optional). The number of blocks in the file to truncate: <ul style="list-style-type: none"> <li>+ N    number of blocks to be deleted from the end of the file.</li> <li>- N    delete all extents and retain the main file.</li> <li>0     the standard close; file closed without truncation.</li> </ul>

### CAUTION

If the number of blocks specified in *ITRUN* is equal to the number of blocks in the file, the file is purged.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

CCE	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
CCL	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
CCG	Not used.

# DCLOS

## NOTE

The DCLOS intrinsic closes the Data Control Block, and makes the RTE file available to other callers. It also gives the user the option of truncating the file size when:

- The file is opened exclusively.
- The current position is in the main file, not in the extent.
- The security codes match at open.
- The number of blocks to be truncated is less than or equal to the number of blocks in the file.

Sends standard RTE I/O control request to RTE type 0, non-disc, file.

## Syntax

```

      LA  I   IV   IV   O-V
DCONT (IDCB,IERR,ICON1[;ICON2]);

```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error codes returned as a result of remote file access.
<i>ICON1</i>	Integer by value (required). Control word specifying an action, such as, backspace one record or skip a line. See the appropriate <i>RTE Programmer's Reference Manual</i> for details.
<i>ICON2</i>	Integer by value (optional). This value is required for some of the functions defined in <i>ICON1</i> , for example, to define the number of lines to be skipped. Refer to the appropriate <i>RTE Programmer's Reference Manual</i> for details.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

<i>CCE</i>	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
<i>CCL</i>	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
<i>CCG</i>	Not used.



# DCRET

Closes the DCB, if open, and creates the named RTE file on the specified disc with the specified number of blocks.

## Syntax

```
LA I LA LA IV IV LA O-V  
DCRET (IDCB,IERR,NAME,ISIZE,ITYPE[ISECU][ICR]);
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Number of sectors or error code returned as a result of remote files access.
<i>NAME</i>	Logical array (required). RTE file name consisting of up to six characters.
<i>ISIZE</i>	Logical array (integer). Two word integer array. Word 1 specifies the number of blocks desired. If the number of blocks is less than 0, the whole disc is used. Word 2, used only for type 2 files, contains the record length in words.  Word 1: The number of blocks desired. Word 2: The record length in words. Type 2 files.
<i>ITYPE</i>	Integer by value (required). Description of the file.  0 non-disc file 1 fixed length 128-word record 2 fixed length records; user defines length 3 variable length records; sequential access, automatic extents 4 ASCII code and source program (otherwise like type 3 files) 5 relocatable binary code (otherwise like type 3 files) 6 save program file (otherwise like type 1 files) 7 absolute binary (otherwise like type 3 files) 8 - 32767 user defined

*ISECU* Integer by value (optional). Two character security code of the file. If 0, no security (default value); if > 0, any may read, specify to write; if < 0, specify to read/write.

*ICR* Logical array (optional). Cartridge number; required during the first create. A five word array where:

*ICR*[0] If 0, use any available cartridge; if >0, cartridge reference number; if <0, LU of the cartridge.

*ICR*[1]-[4] ASCII representation of the DS device class name, logical device number, or node name for DS/X.25.

See the *DS/1000-IV User's Manual* for greater detail.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

*CCE* No error with DSN/DS at either end. Check *IERR* for result on the HP 1000. If *IERR* < 0, then there is an FMP error. DCRET will return a positive value in *IERR* upon successful completion to represent the number of sectors allocated to the file.

*CCL* Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.

*CCG* Not used.

### NOTE

The RTE file created by the DCRET intrinsic is left open exclusively to the caller upon successful completion of the intrinsic call.

This intrinsic does not create a type 0 file. These are device files, such as line printers or card readers. Type 0 files may be created only by FMGR commands at the HP 1000.

# DLOCF

Remotely accesses a DCB maintained in RTE to obtain location and status information about the next record.

## Syntax

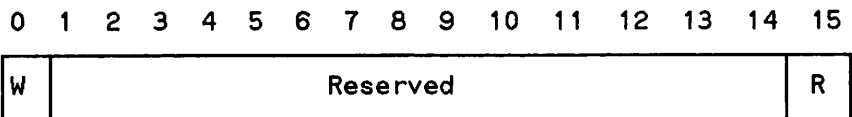
```

      LA  I  I  I  I  I  I  I  I  O-V
DLOCF (IDCB,IERR,IREC[IRB][IOFF][JSEC][JLU][JTY][JREC]);

```

## Parameters

- IDCB** Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
- IERR** Integer (required). The error code returned as a result of remote file access.
- IREC** Integer (required). Returns the record number of next sequential record. Record numbers begin with 1.
- IRB** Integer (optional). Returns the block number of the current block.
- IOFF** Integer (optional). Returns a word offset, within the current block, at which the next record will begin.
- JSEC** Integer (optional). Returns the number of sectors in the main file.
- JLU** Integer (optional). Returns the logical unit number of the file on disc, or of the non-disc device for type 0 files.
- JTY** Integer (optional). Returns the file type as indicated in DCB.
- JREC** Integer (optional). Returns the record size in words. For type 0 files a read/write code is returned as follows:



R    Read (Bit 15) = 1  
W    Write (Bit 0) = 1

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

- CCE            No error with DSN/DS at either end. Check *IERR* for result on the HP 1000. If *IERR* < 0, then there is an FMP error.
- CCL            Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
- CCG            Not used.

# DNAME

Closes the DCB, if open, and renames the specified RTE file.

## Syntax

```
LA I LA LA IV LA O-V
DNAME (IDCB,IERR,NAME,NNAME[ISECU][ICR]);
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error code returned as a result of remote file access.
<i>NAME</i>	Logical array (required). Current RTE file name up to six characters.
<i>NNAME</i>	Logical array (required). New RTE file name up to six characters.
<i>ISECU</i>	Integer by value (optional). Two character security code of the old file. Remains unchanged.
<i>ICR</i>	Logical array. Required if file is currently open to user. A five word array where:  <i>ICR</i> [0] Cartridge number. If specified the search is limited to just that cartridge. If not specified all cartridges are searched, but only the first file encountered with the old name is changed.  <i>ICR</i> [1]-[4] ASCII representation of the DS device class name, logical device number, or node name for DS/X.25. DSLINE.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

<i>CCE</i>	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
<i>CCL</i>	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
<i>CCG</i>	Not used.

Closes the DCB, if open, and opens the named RTE file.

## Syntax

```

      LA  I   LA  IV   IV   LA   O-V
DOPEN (IDCB,IERR,NAME[IOPTN][ISECU][ICR]);
    
```

## Parameters

- IDCB** Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
- IERR** Integer (required). The file type or error code returned as a result of remote file access.
- NAME** Logical array (required). RTE file name assigned to file of up to six characters.
- IOPTN** Integer by value (optional). This value specifies non-standard conditions desired when opening a file. See the *DS/1000-IV User's Manual* for details of the file options available.

### NOTE

The parameter *IOPTN* for:

- A type 2 file must be modified in update mode.
- A type 3, and greater, file is modified in a non-update mode, and writes an EOF after each record.

- ISECU** Integer by value (optional). Two character or binary security code of the file. If 0, no security (default value); if > 0, any may read, specify to write; if < 0, specify to read/write.

# DOPEN

<b>NOTE</b>
-------------

If the file was created (see DCRET call) with a non-zero security code, this parameter must be specified and it must match the original security code assigned to the file.

**ICR** Logical array (required during first open). A five word array where:

**ICR[0]** Cartridge number.

**ICR[1]-[4]** ASCII representation of the DS device class name, logical device number, or node name for DS/X. 25.

See the *DS/1000-IV User's Manual* for details (RFA Call Parameter Variations).

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

**CCE** No error with DSN/DS at either end. Check *IERR* for result on the HP 1000. If *IERR* < 0, then there is an FMP error. DOPEN will return a positive value if the call is successfully completed to represent the file type.

**CCL** Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.

**CCG** Not used.

Skips forward or backward a specified number of records, or to an absolute record number.

## Syntax

```
LA I IV IV O-V  
DPOSN (IDCB,IERR,NUR[IR]);
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error code returned as a result of remote file access.
<i>NUR</i>	Integer by value (required). The number of records to be skipped from the current file pointer position:  + N      number of records forward  - N      number of records backward  0        no operation
<i>IR</i>	Integer by value (optional). The absolute or relative position of the record:  0 = <i>NUR</i> indicates a relative position. Default value.  1 = <i>NUR</i> indicates an absolute record number within the file.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

CCE	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
CCL	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
CCG	Not used.



# DPURG

Closes the DCB, if open, and deletes the named RTE file and all its extents.

## Syntax

```
DPURG (IDCB, IERR, NAME [ISECU] [ICR]);
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error code returned as a result of remote file access.
<i>NAME</i>	Logical array (required). RTE file name consisting of up to six characters that identifies the file to be purged.
<i>ISECU</i>	Integer by value (optional). Two character security code of the file. If 0, no security (default value); if > 0, any may read, specify to write; if < 0, specify to read/write.
<i>ICR</i>	Logical array (required if file not presently open to the user). A five word array where:  <i>ICR</i> [0]                      Cartridge number.  <i>ICR</i> [1]-[4]                  ASCII representation of the DS device class name, logical device number, or node name for DS/X.25.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

<i>CCE</i>	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
<i>CCL</i>	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
<i>CCG</i>	Not used.

Reads a record from the RTE file currently open to DCB, to the user buffer.

## Syntax

```

      LA  I   LA  IV  I   IV   O-V
DREAD (IDCB,IERR,IBUF,IL[LEN][NUM]);

```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). The error code returned from accessing remote file.
<i>IBUF</i>	Logical array (required). The buffer to which data is read.
<i>IL</i>	Integer by value (required). A read request buffer length that specifies the number of words to be transferred. The buffer size is limited to 512 words.
<i>LEN</i>	Integer (optional). Actual number of words transferred to the buffer. If length = -1, an end of file was read.
<i>NUM</i>	Integer by value (optional). Record number for random access type 1 and type 2 files:  If <i>NUM</i> = 0, transfer starts at current pointer position (default). If <i>NUM</i> > 0, transfer starts at absolute record position. If <i>NUM</i> < 0, transfer starts at current position.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

<i>CCE</i>	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
<i>CCL</i>	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
<i>CCG</i>	Not used.

# DSTAT

Returns information on all cartridge labels in the RTE system.

## Syntax

```
          LA  I   LA   O-V  
DSTAT (ISTAT,IERR,IDEST);
```

## Parameters

<i>ISTAT</i>	Logical array (required). A 125-word buffer for directory information. See the appropriate <i>RTE Programmer's Reference Manual</i> for details.
<i>IERR</i>	Integer (required). Error code returned as a result of remote file access.
<i>IDEST</i>	Logical array (required). ASCII representation of the DS device class name, logical device number, or node name for DS/X.25 (4-word array).

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

CCE	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
CCL	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
CCG	Not used.

Rewinds RTE device type 0 files and resets RTE disc files to the beginning of the first record in the file.

## Syntax

```
LA I O-V  
DWIND (IDCB,IERR);
```

## Parameters

- IDCB** Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
- IERR** Integer (required). Error code returned as a result of remote file access.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

- CCE** No error with DSN/DS at either end. Check *IERR* for result on the HP 1000. If *IERR* < 0, then there is an FMP error.
- CCL** Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
- CCG** Not used.

# DWRIT

Writes a record on the RTE file currently open to the DCB from the user buffer.

## Syntax

```
LA I LA IV IV O-V  
DWRIT (IDCB,IERR,IBUF,IL[NUM]);
```

## Parameters

<i>IDCB</i>	Logical array (required). The Data Control Block (DCB) is a four word array used for each RTE file opened. This is used by the system and should not be modified.
<i>IERR</i>	Integer (required). Error code returned as a result of remote file access.
<i>IBUF</i>	Logical array (required). Buffer from which data is written to record.
<i>IL</i>	Integer by value. Number of words from <i>IBUF</i> to be written. The buffer size is limited to 512 words.
<i>NUM</i>	Integer by value (optional). Record number for random access type 1 and type 2 files:  If <i>NUM</i> = 0, transfer starts at current pointer position (default). If <i>NUM</i> > 0, transfer starts at absolute record position. If <i>NUM</i> < 0, transfer starts at current position.

## Error Conditions

Follow each call to an RFA intrinsic with a test of condition codes.

CCE	No error with DSN/DS at either end. Check <i>IERR</i> for result on the HP 1000. If <i>IERR</i> < 0, then there is an FMP error.
CCL	Indicates problems at the HP 3000 end. Refer to Appendix A for summary of the RFA error codes. This value may also represent a DSN/DS/3000 subsystem or MPE file system error.
CCG	Not used.

# RFA EXAMPLE: SPL

The following SPL/3000 program shows how remote files can be accessed using the remote file access calls to pass files between the HP 3000 and the remote HP 1000.

```
$CONTROL USLINIT
BEGIN
```

```
COMMENT
```

```
THIS PROGRAM TRANSFERS ONE ASCII RTE FILE TO AN MPE FILE. BECAUSE
OF DIFFERENCES BETWEEN RTE AND MPE FILE FORMATS, THE RTE FILE IS
TRANSFERRED AS 72-CHARACTER UNNUMBERED RECORDS. THE USER IS PROMPTED
FOR THE NAME OF AN RTE FILE OR /E TO EXIT THE PROGRAM. AFTER THE RTE
FILE IS OPENED, THE PROGRAM PROMPTS FOR THE NAME OF A NEW MPE FILE OR
/E TO EXIT THE PROGRAM. THE PROGRAM THEN CREATES THE MPE FILE AND THE
RECORDS ARE TRANSFERRED FROM THE RTE FILE TO THE MPE FILE.
UPON COMPLETION, THE PROGRAM PRINTS THE NUMBER OF RECORDS
TRANSFERRED AND TERMINATES;
```

```
INTEGER FILENUM,ERROR,I, LGTH;
INTEGER NORECORDS:=0;
```

```
LOGICAL OPEN,MOREDATA:=TRUE;
```

```
INTEGER ARRAY DCB(0:4),
                BUFFER(0:32),
                FILENAME(0:13),
                CRN(0:4);
```

```
BYTE ARRAY MSG(0:59);
BYTE ARRAY NUMBER(0:5);
BYTE ARRAY FILENAMEB(*)=FILENAME;
```

```
ARRAY MSGI(*)=MSG;
ARRAY NUMBERI(*)=NUMBER;
```

```
INTRINSIC FOPEN, FWRITE, FCLOSE, PRINT, READ, ASCII, BINARY,
PRINT'FILE'INFO, QUIT, DOPEN, DREAD, DCLOS;
```

```
PROCEDURE ERRORPROC(CC,QUITNO);
VALUE CC,QUITNO;
INTEGER CC,QUITNO;
```

```
BEGIN
```

```
MOVE MSG(0):=" ";
MOVE MSG(1):=MSG(0),(59);
IF CC=-1 THEN
```

```
<<RFA RETURNED CCL>>
```

```
    BEGIN
```

```
        MOVE MSG:="** HP 3000 RFA ERROR: ";
        ASCII(ERROR,10,MSG(22));
        PRINT(MSGI,-25,0);
```

```
    END
```

```
ELSE IF CC=0 THEN
```

```
<<RFA RETURNED CCE WITH ERROR>>
```

```
    BEGIN
```

# RFA EXAMPLE: SPL

```
        MOVE MSG:="** HP 1000 RFA ERROR: ";
        ASCII(ERROR,10,MSG(22));
        PRINT(MSGI,-25,0);
    END;
    QUIT(QUITNO);
END;

<<BEGIN MAIN CODE>>

<<PROMPT USER FOR RTE FILE NAME,
    CARTRIDGE REFERENCE NUMBER AND DSLINE>>
OPEN:=FALSE;
WHILE NOT OPEN DO
    BEGIN
        MOVE MSG:="ENTER NAME OF RTE FILE: ";
        PRINT(MSGI,12,%320);
        MOVE FILENAMEB:=28(" ");
        READ(FILENAME,-6);
        IF FILENAME(0)="/E" THEN GO TO ENDIT;

        MOVE MSG:="ENTER CARTRIDGE REFERENCE NUMBER: ";
        PRINT(MSGI,17,%320);
        MOVE NUMBER:=6(" ");
        READ(NUMBERI,-6);
        CRN(0):=BINARY(NUMBER,6);

        MOVE MSG:="ENTER THE DS DEVICE LDEV OR CLASS NAME: ";
        PRINT(MSGI,20,%320);
        MOVE CRN(1):=4(" ");
        READ(CRN(1),-8);

        DOPEN(DCB,ERROR,FILENAME,%100,0,CRN);
        IF < THEN ERRORPROC(-1,1);
        IF ERROR < 0 THEN ERRORPROC(0,2);
        OPEN:=TRUE;
    END;

<<PROMPT FOR MPE FILE NAME AND CREATE IT>>
OPEN:=FALSE;
WHILE NOT OPEN DO
    BEGIN
        MOVE MSG:="ENTER NAME OF MPE FILE: ";
        PRINT(MSGI,12,%320);
        MOVE FILENAMEB:=28(" ");
        READ(FILENAME,-28);
        IF FILENAME(0)="/E" THEN GO TO ENDIT;
        FILENUM:=FOPEN(FILENAMEB,4,%344,36);
        IF < THEN PRINT'FILE'INFO(FILENUM)
            ELSE OPEN:=TRUE;
    END;

<<TRANSFER DATA>>
MOREDATA:=TRUE;
WHILE MOREDATA DO
```

# RFA EXAMPLE: SPL

BEGIN

```
DREAD(DCB,ERROR,BUFFER(1),36,LGTH);
IF < THEN ERRORPROC(-1,3);
IF ERROR < 0 THEN ERRORPROC(0,4);
IF LGTH=-1 THEN MOREDATA:=FALSE
ELSE
  BEGIN
    FOR I:=LGTH+1 UNTIL 35 DO BUFFER(I):=" ";
    FWRITE(FILENUM,BUFFER(1),36,0);
    IF <> THEN
      BEGIN
        PRINT'FILE'INFO(FILENUM);
        MOREDATA:=FALSE;
      END
    ELSE NORECORDS:=NORECORDS+1;
  END;
END;
```

ENDIT:

```
DCLOS(DCB,ERROR);
IF < THEN ERRORPROC(-1,5);
IF ERROR < 0 THEN ERRORPROC(0,6);
FCLOSE(FILENUM,%11,0);
MOVE MSG(0):=" ";
MOVE MSG(1):=MSG(0),(59);
MOVE MSG:="NUMBER OF RECORDS TRANSFERRED = ";
ASCII(NORECORDS,10,MSG(32));
PRINT(MSGI,18,%40);
```

END.



# RFA EXAMPLE: FORTRAN

The following FORTRAN program shows how to create a file on the remote HP 1000.

```
$CONTROL INIT
  PROGRAM RFATR
C THIS PROGRAM CREATES A NEW FILE ON THE RTE SYSTEM.
C IT PROMPTS FOR INPUT, AND WRITES EACH RECORD
C INTO THE NEW FILE USING RFA INTRINSICS.
C UPON COMPLETION IT DISPLAYS THE CONTENTS,
C AND CLOSES, AND TRUNCATES THE FILE.
C
C
  INTEGER BLOCKNUM, IERR, IERROR, ISIZE, LENGTH
  INTEGER OPTN, RECNM, SECURITY
  INTEGER TRUNCATE, TYPE
C
  LOGICAL CRTNM(5), DCB(4), NAME(3), SIZE(2)
  LOGICAL BUFFER(40)
C
  CHARACTER ANSW(6), BUFBYTE(72), BUFCHAR*72
  CHARACTER CRTBYTE(8), FORMALDES*8
  INTEGER BUFINTG(2)
  LOGICAL BUFPRNT(40)
C
  EQUIVALENCE (BUFFER, BUFBYTE)
  EQUIVALENCE (BUFFER, BUFINTG)
  EQUIVALENCE (BUFFER, BUFCHAR)
  EQUIVALENCE (CRTNM(2), CRTBYTE)
C
  SYSTEM INTRINSIC DCLOS, DCRET, DLOC, DOPEN
  SYSTEM INTRINSIC DPURG, DREAD, DWRT
  SYSTEM INTRINSIC FCHECK, FCLOSE, FOPEN
  SYSTEM INTRINSIC FREAD
C
  DATA FORMALDES/8H$STDINX /
C
C ***** MAIN PROGRAM *****
C
  WRITE(6,102)
102  FORMAT(" BUILD FILE ON REMOTE RTE SYSTEM.")
  WRITE(6,112)
112  FORMAT(/,"+DSLINER NUMBER = ? ")
  DO 115 I=1,5
115  CRTNM(I)=%20040L
  READ(5,*)CRTBYTE
C
120  WRITE(6,122)
122  FORMAT("+SPECIFY NEW FILE NAME = ? ")
  DO 123 I=1,3
123  NAME(I)=%20040L
  READ(5,124)NAME
124  FORMAT(3A2)
C
  WRITE(6,126)
```

# RFA EXAMPLE: FORTRAN

```

126 FORMAT("+SPECIFY FILE SECURITY CODE ",
          *(DEFAULT = 0) = ?")
      READ(5,130)SECURITY
130 FORMAT(A2)
C
      WRITE(6,134)
134 FORMAT("+SPECIFY CARTRIDGE NUMBER = ?")
      READ(5,201)CRTNM(1)
201 FORMAT(A2)
C
C PREPARE TO DCRET
C
      TYPE = 4
C
      SIZE(1)=%100L
C
      CALL DCRET(DCB,IERR,NAME,SIZE,TYPE,SECURITY,
          *CRTNM)
      IF (.CC.) 1240,209,209
209 IF (IERR) 1260,300,300
C
C OPEN TERMINAL AS FILE
C
300 IFN=FOPEN(FORMALDES)
      IF(.CC.)305,309,309
305 CALL FCHECK(IFN,IERROR)
      WRITE(6,306)IERROR
306 FORMAT(" FOPEN $STDINX FAILED, CCL. ERROR = ",I6)
      STOP
C
C FILE NOW CREATED
C
309 LENGTH = 36
310 WRITE(6,312)
312 FORMAT(" WRITE COMMANDS, TERMINATE WITH "
          *"'STOP' ",/)
C
C LOOP
C
400 DO 410 I=1,36
410 BUFFER(I)=%20040L
C
C USE FREAD TO ALLOW ':' AND ','
C
      ICNT=FREAD(IFN,BUFFER,36)
      IF(.CC.) 1050,420,600
C
C TEST FOR '??'
C
420 IF(BUFINTG(1).EQ.%37477) GO TO 1100
C
C TEST FOR 'STOP'
C
      IF((BUFINTG(1).EQ.%51524).AND.(BUFINTG(2)

```

## RFA EXAMPLE: FORTRAN

```
      *.EQ.%47520)) GO TO 600
C
      CALL DWRITE(DCB,IERR,BUFFER,ICNT)
      IF(.CC.) 1020,430,430
C
430  IF (IERR) 1000,400,400
C
C END OF LOOP
C
600  WRITE(6,606)
606  FORMAT(" BEGIN VERIFICATION:")
C
      CALL DCLOS(DCB, IERR)
      IF(.CC.) 1300,620,620
620  IF(IERR) 1200,675,675
C
C DCLOS COMPLETED.  CLOSE TERMINAL.
C
675  CALL FCLOSE(IFN,0,0)
      IF(.CC.)690,700,700
C
690  WRITE(6,692)
692  FORMAT(" FCLOSE FAILED, CCL")
      STOP
C
C READ, VERIFY, AND TRUNCATE FILE
C OPEN OPTN=2 TO ALLOW TRUNCATION
C
700  OPTN=2
      CALL DOPEN(DCB, IERR, NAME, OPTN, SECURITY,
      *CRTNM)
      IF(.CC.) 1340,705,705
705  IF (IERR)1360,1370,730
C
730  WRITE(6,732)IERR
732  FORMAT(" FILE TYPE = ",I6)
C
C VERIFY LOOP
C
      ISIZE=36
740  DO 742 I=1,40
742  BUFFER(I)=%20040L
C
750  CALL DREAD(DCB, IERR, BUFFER, ISIZE)
      IF(.CC.) 1380, 755, 755
C
755  IF(ISIZE.EQ.0) GO TO 800
      IF(IERR.EQ.-12) GO TO 800
      IF(IERR)1220,760,760
C
760  BUFPRNT(1)=%20040L
      DO 758 I=1,39
758  BUFPRNT(I+1)=BUFFER(I)
C
```

# RFA EXAMPLE: FORTRAN

```
      WRITE(6,762)BUFPRNT
762  FORMAT(40A2)
C
      GO TO 740
C
C END VERIFY LOOP
C
C ENCOUNTERED END OF FILE
C
800  CALL DLOGF( DCB, IERR, RECNM, BLOCKNUM)
      IF(.CC.) 1320, 802, 802
802  IF(IERR)1330,803,803
C
803  TRUNCATE=64-(BLOCKNUM+1)
      CALL DCLOS( DCB, IERR, TRUNCATE)
      IF(.CC.) 1300, 805, 805
805  IF(IERR) 1200, 820, 820
C
820  WRITE(6,822)
822  FORMAT(" PROGRAM COMPLETED")
      STOP
C
C *** ERROR CONDITIONS ***
C
C DWIT ERRORS
C
1000 WRITE(6,1002)IERR
1002 FORMAT(" DWIT ERROR, IERR = ",I6)
      GO TO 600
C
1020 WRITE(6,1022)IERR
1022 FORMAT(" CCL ON DWIT, IERR = ",I6)
      STOP
C
1050 CALL FCHECK(IFN, IERR)
      WRITE(6,1052)IERR
1052 FORMAT(" BAD READ FROM TERMINAL, IERR = ",
          *I6)
      GO TO 310
C
C
1100 WRITE(6,1110)
1110 FORMAT(" GO TO ?? PART ")
      WRITE(6,1120)
1120 FORMAT(" THIS PROGRAM CREATES A FILE ",
          *"ON THE RTE.")
      WRITE(6,1130)
1130 FORMAT(" IT WRITES THE COMMANDS, THEN",
          *" CLOSES THE FILE.")
      GO TO 310
C
C
1200 WRITE(6,1202)IERR
1202 FORMAT(" DCLOS ERROR, IERR = ",I6)
```

## RFA EXAMPLE: FORTRAN

```
      STOP
C
1220 WRITE(6,1222)IERR
1222 FORMAT(" DREAD ERROR, IERR = ",I6)
      STOP
C
1240 WRITE(6,1242)IERR
1242 FORMAT(" CCL ON DCRET, IERR = ",I6)
      STOP
C
1260 IF(IERR.EQ.-2) GO TO 1400
      WRITE(6,1262)IERR
1262 FORMAT(" DCRET ERROR, IERR = ",I6)
      STOP
C
1270 WRITE(6,1272)IERR
1272 FORMAT(" CCL ON DPURG, IERR = ",I6)
      STOP
C
1290 WRITE(6,1292)IERR
1292 FORMAT(" DPURG ERROR, IERR = ",I6)
      STOP
C
1300 WRITE(6,1302)IERR
1302 FORMAT(" CCL ON DCLOS, IERR = ",I6)
      STOP
C
1320 WRITE(6,1322)IERR
1322 FORMAT(" CCL ON DLOCF, IERR = ",I6)
      STOP
C
1330 WRITE(6,1332)IERR
1332 FORMAT(" DLOCF ERROR, IERR = ",I6)
      STOP
C
1340 WRITE(6,1342)IERR
1342 FORMAT(" CCL ON DOPEN, IERR = ",I6)
      STOP
C
1360 WRITE(6,1362)IERR
1362 FORMAT(" DOPEN ERROR, IERR = ",I6)
      STOP
C
1370 WRITE(6,1372)
1372 FORMAT(" FAILED TO DOPEN FILE, IERR = 0")
      STOP
C
1380 WRITE(6,1382)IERR
1382 FORMAT(" CCL ON DREAD, IERR = ",I6)
      STOP
C
C DUPLICATE FILE NAME IN DCRET
C
1400 WRITE(6,1402)
```

# RFA EXAMPLE: FORTRAN

```
1402 FORMAT("+DUPLICATE FILE NAME, WISH TO ",  
  *" PURGE (Y/N) = ?")  
  READ(5,*)ANSW(1)  
  IF(ANSW(1).EQ."N") GO TO 120  
  IF(ANSW(1).EQ."Y") GO TO 1410  
  GO TO 1400
```

C

```
1410 CALL DPURG(DCB, IERR, NAME, SECURITY, CRTNM)  
  IF (.CC.) 1270, 1412, 1412
```

C

```
1412 IF(IERR) 1290, 1420, 1420
```

C

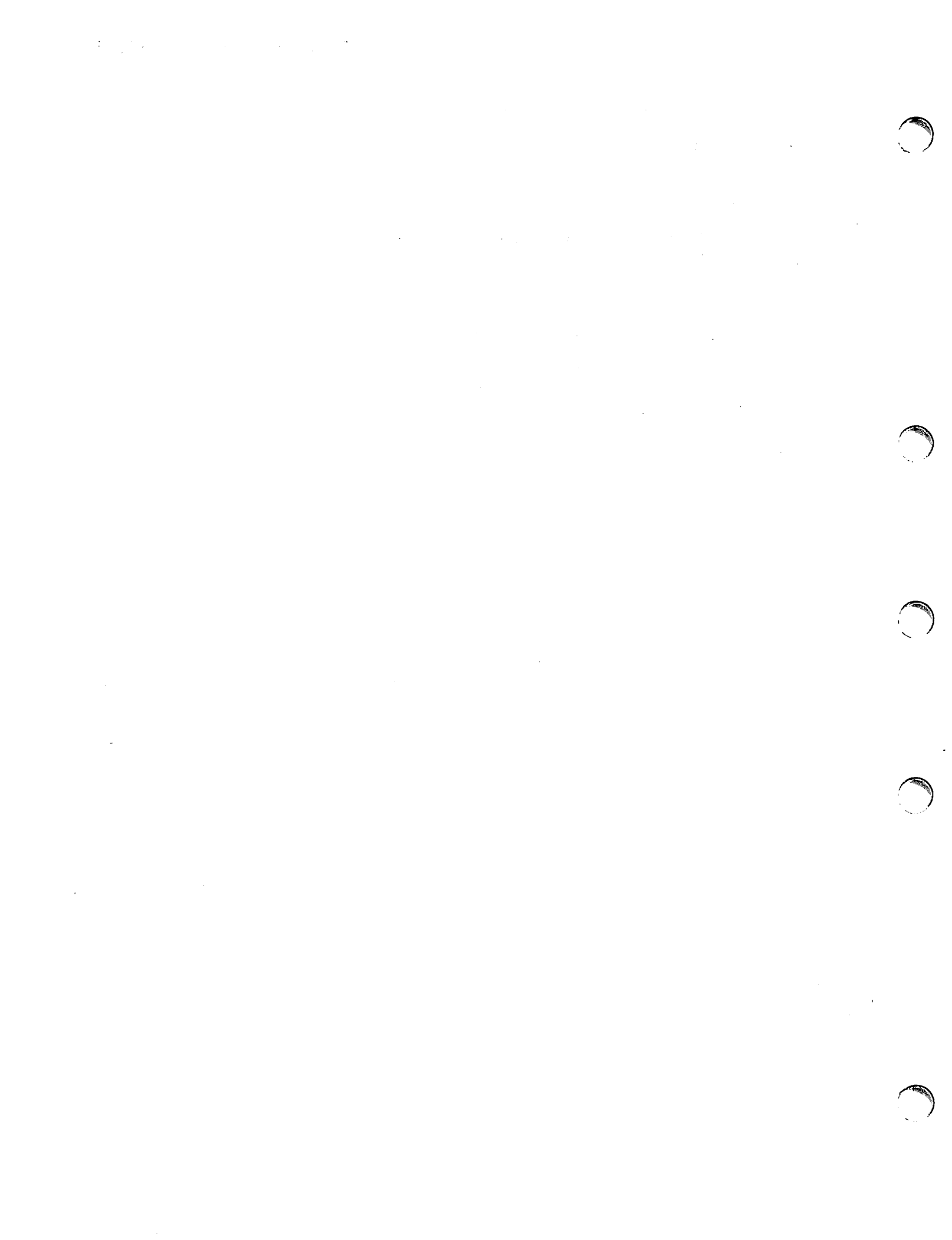
```
1420 CALL DCRET(DCB, IERR, NAME, SIZE, TYPE,  
  *SECURITY, CRTNM)  
  IF(.CC.) 1240, 1430, 1430
```

C

```
1430 IF(IERR) 1260,300,300
```

C

```
END
```



The preceding chapters describe how to establish communications links between HP 3000 and HP 1000 computers in order to form a communications network, and how to execute programs in any HP 3000 or HP 1000 from a single log-on terminal. Furthermore, the programs running within any HP 3000 or HP 1000 in the DS network can, under the proper circumstances, access the hardware or software resources available at either end.

However, for most remote processing applications it is essential that separate user programs be able to run simultaneously in separate computers within the network, and also be able to communicate efficiently with one another. The DSN/DS/3000 program-to-program (PTOP) intrinsics described in this chapter provide that capability.

The structure of the two programs that are communicating with one another in this manner is not symmetrical. One of them, referred to as the *master* program, is always in control and is the one that initiates all activity between the two programs. The other, referred to as the *slave* program, is always responding to requests received from the master. Those intrinsics used within a master program are summarized in Table 6-1 and those used within a slave program are summarized in Table 6-2.

The master program can reside on either the HP 3000 or HP 1000; the program residing on the system opposite of the master is called the slave. The program, either slave or master, residing on the HP 3000 system can be written in SPL, FORTRAN, COBOL, BASIC, PASCAL, or COBOL/II. The program, slave or master, residing on the HP 1000 system can be written in FORTRAN, PASCAL or assembly language. The calling sequences of HP 1000 programs are described in the *DS/1000-IV User's Manual*.

**Table 6-1. Master Program-to-Program Intrinsics**

HP 1000	HP 3000	FUNCTION
POPEN	POPEN	Initiates and activates a slave process in a remote system using a specified remote program file.
PREAD	PREAD	Sends a request to the remote slave program asking the slave to send a block of data back to the master.
PWRIT	PWRITE	Sends a block of data to the remote slave program.
PCONT	PCONTROL	Transmits a tag field containing user-defined control information to the remote slave program and receives a tag field back from the slave.
PCLOS	PCLOSE	Terminates the remote slave process.
	PCHECK	Returns an integer code specifying the completion status of the most recently executed master program-to-program intrinsic.



The master program-to-program intrinsics are very similar to the MPE process handling and file system intrinsics that are used for process-to-process communication within a single-system environment.

**Table 6-2. Slave Program-to-Program Intrinsics**

HP 1000	HP 3000	FUNCTION
GET	GET	Receives the next request from the master program.
ACEPT	ACCEPT	Accepts and completes the request received by the preceding GET intrinsic call.
REJCT	REJECT	Rejects the request received by the preceding GET intrinsic call.
	PCHECK	Returns an integer code specifying the completion status of the most recently executed slave program-to-program intrinsic.
FINIS		Terminates communication with a master program but resources are not released. The only released resources are those allocated by DS/1000-IV software. The ID segment for the slave will still exist.

**NOTE**

PCHECK is not required on the HP 1000 because there is an error parameter for each HP 1000 PTOP call.

The HP 1000 program-to-program calls perform the same functions as their HP 3000 counterparts, but may have slightly different names for parameters. Refer to the *DS/1000-IV User's Manual* for details.

Once a DS communications link exists between an HP 3000 and HP 1000, a user program (the master program) can create and activate a slave program. The POPEN intrinsic performs this function in place of the standard MPE CREATE and ACTIVATE intrinsics.

When the master and slave program are both executing, the master program can send data (PWRITE) or control information (PCONTROL) directly to the slave program. The master can also send a read request (PREAD), or control request (PCONTROL) to the slave program asking that the slave send data and/or control information back to the master.

When the master program in a master/slave pair exists on the HP 1000, the master program must make a call to HELLO to establish an HP 3000 session before calling POPEN to an HP 3000 slave program. Refer to the *DS/1000-IV User's Manual* for details.

## Performance Considerations

The communications system overhead for a PTOP transfer and an RFA transfer is comparable. However, when designing applications, PTOP solutions may provide greater throughput compared to RFA because of the ability to pack data into the buffer. The actual size of the PTOP transfer depends upon the buffer size library used in the HP 1000 system, along with the configured line size of the communications link as set by the DSCONTROL command. The three HP 1000 libraries allow data buffers of approximately 304, 1072, and 4096 words.

When an HP 3000 master communicates with a HP 1000 slave, the maximum total data buffer is either 512, 1024 or 4096 words, depending upon which HP 1000 library is used. When a HP 1000 master communicates with a HP 3000 slave, it can transfer up to 4096 words.

## PTOP Intrinsic

In the following descriptions of program-to-program intrinsic, superscripts are used to describe the types of parameters and whether they must be passed by value. The default is by reference. The superscripts have the following meanings:

SUPERSCRIP	MEANING
BA	byte array
BP	byte pointer
D	double
DA	double array
DV	double by value
I	integer
IA	integer array
IV	integer by value
L	logical
LA	logical array
LV	logical by value
O-V	option variable
R	real

# ACCEPT

Accepts and completes the requests received by the preceding GET intrinsic call and returns an optional tag field to the remote HP 1000 master program.

## Syntax

```
ACCEPT ( [IA]ITAG [IA]TARGET [IV]TCOUNT [O-V] );
```

The ACCEPT intrinsic accepts the request received by the most recent GET intrinsic call, completes the requested operation, and transmits an optional tag field back to the remote HP 1000 master program.

In the case of a POPEN request, the ACCEPT call transmits an optional tag field, *ITAG*, to the remote HP 1000 master program.

In the case of a PREAD request, the ACCEPT call transmits the specified number of words, *TCOUNT*, from *TARGET* to the remote HP 1000 master program and transmits an optional tag field, *ITAG*, to the remote HP 1000 master program. See Figure 6-1.

### NOTE

You may want to refer to Figure 6-3 in conjunction with Figure 6-1. Figure 6-3 shows the GET activity with PREAD which would occur prior to the ACCEPT activity.

In the case of a PWRIT request, the ACCEPT call moves the specified number of words, *TCOUNT*, from the DS buffer to *TARGET* and transmits an optional tag field, *ITAG*, to the remote HP 1000 master program. See Figure 6-2.

### NOTE

You may want to refer to Figure 6-4 in conjunction with Figure 6-2. Figure 6-4 shows the GET activity with PWRIT which would occur prior to the ACCEPT activity.

In the case of a PCONTROL request, the ACCEPT call transmits an optional tag field, *ITAG*, to the remote HP 1000 master program.

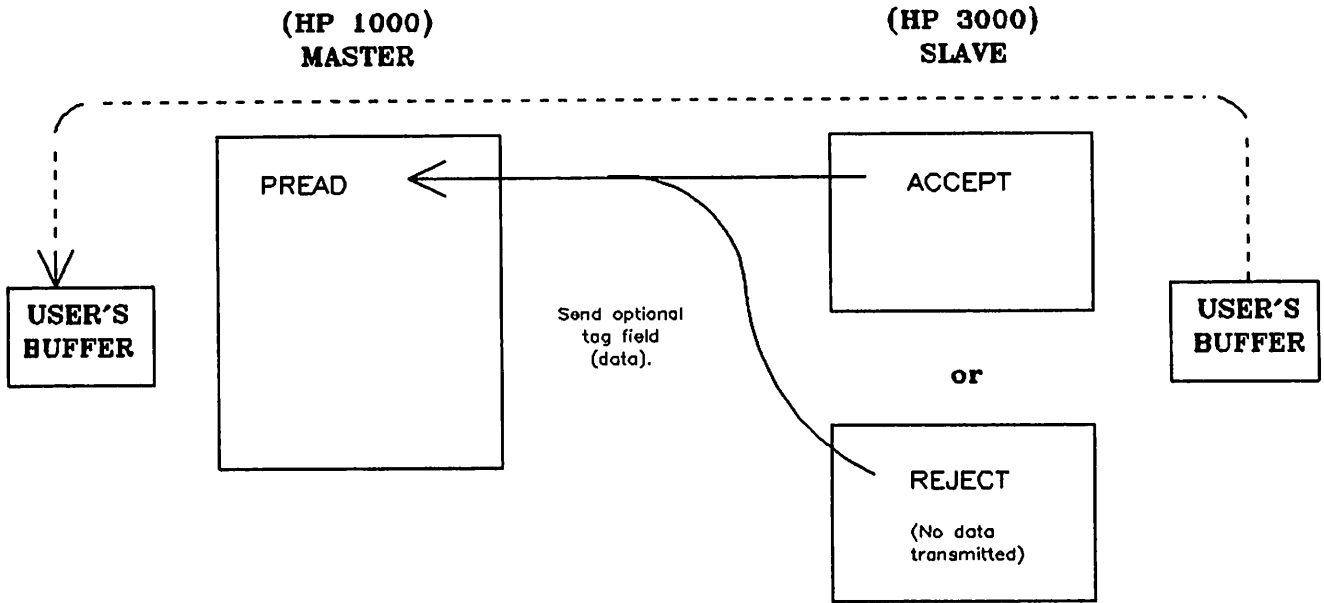


Figure 6-1. ACCEPT Activity for PREAD

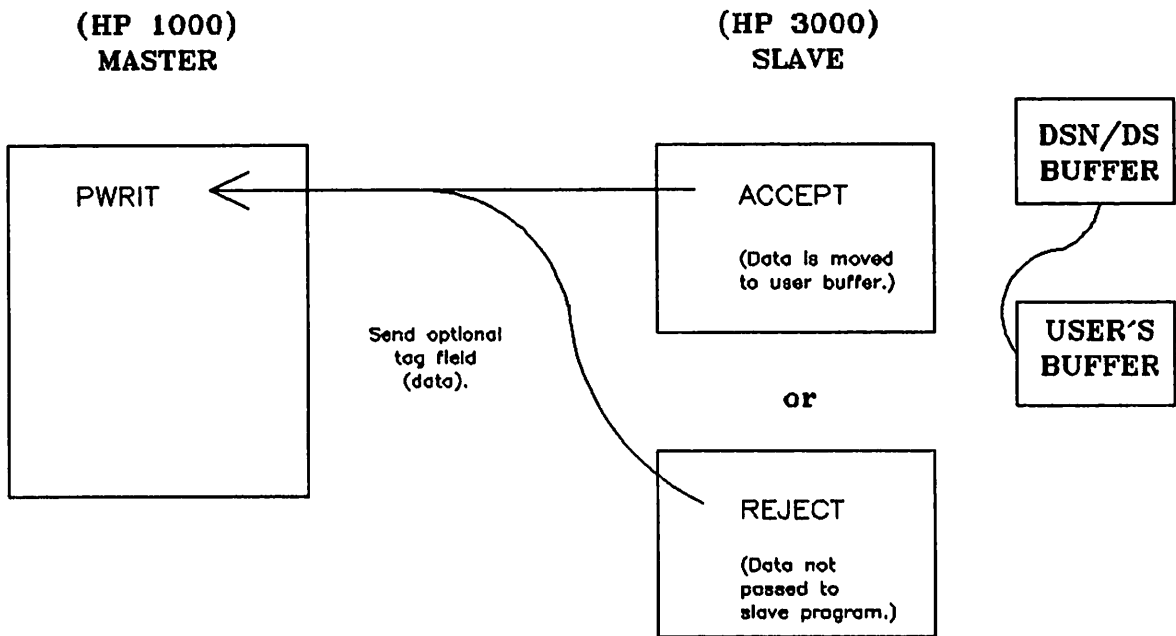


Figure 6-2. ACCEPT Activity for PWRIT

# ACCEPT

## Parameters

- ITAG** Integer array (optional). A 20-word array used for transmitting a tag field. The format of the tag field is defined by the master and slave programs of the user.
- TARGET** Integer array (optional). An array for transmitting or receiving blocks of data.
- For PREAD requests, this array contains the block of data to be transmitted to the remote HP 1000 master program.
- For PWRITE requests, this array receives the block of data from the DS buffer.
- For POPEN and PCONTROL requests, this array has no meaning and should be omitted.
- TCOUNT** Integer by value (optional). An integer specifying the number of words (if positive) or bytes (if negative) to be transmitted or received.
- For PREAD requests, this parameter specifies how many words of data are to be transmitted from *TARGET* to the remote HP 1000 master program.
- For PWRITE requests, this parameter specifies how many words of data are to be moved from the DS buffer to *TARGET*.
- For POPEN and PCONTROL requests, this parameter has no meaning and should be omitted.

## Error Conditions

- CCE** Request completed successfully.
- CCG** Not returned.
- CCL** An error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

Slave callable. Receives the next request from the remote HP 1000 master program.

## Syntax

```

      I           IA   I       I           O-V
ifun: = GET ([ITAG][IL][IONUMBER]);

```

The GET intrinsic receives the next request from the remote HP 1000 master program and accepts an optional tag field, available in *ITAG*.

## Functional Return

When the GET intrinsic is executed, it returns to the HP 3000 slave program a number, *ifun*, specifying the type of request received from the remote HP 1000 master program:

<i>ifun</i>	Meaning
0	A error occurred. This value is returned only when the condition code CCL is also returned. Issue a PCHECK intrinsic call with a <i>DSNUM</i> parameter of zero to determine what happened.
1	POPEN request received.
2	PREAD request received.
3	PWRIT request received.
4	PCONT request received.
5	This value is returned only when the condition code CCG is returned. It indicates that a pending MPE File System I/O-without-wait request was completed instead of a DS remote I/O request. The parameter <i>IONUMBER</i> contains the file number associated with the completed I/O request.

The GET intrinsic call implicitly issues an IOWAIT(0) intrinsic call. The parameter *ifun* value of 0 indicates that an IOWAIT error occurred. An *ifun* value of 5 occurs only if you are executing MPE File System intrinsic calls without wait in your program and the implicit IOWAIT(0) call completes a pending File System I/O request instead of the expected DS remote I/O request. In this case you will have to issue another GET call after processing the completed File System I/O request in order to receive the expected DS remote I/O request.

# GET

## Parameters

- ITAG** Integer array (optional). A 20-word array used for receiving a tag field. The format of the tag field is defined by the master and slave programs of the user.
- IL** Integer (optional). A word that has meaning only when a PREAD or PWRIT request is received from the remote HP 1000 master program. For a PREAD request, *IL* contains an integer specifying the number of words requested by the remote HP 1000 master program. For a PWRIT request, *IL* contains an integer specifying the number of words transmitted from the remote HP 1000 master program to the DS buffer. See Figures 6-3 and 6-4.
- IONUMBER** Integer (optional). A word that has meaning only when the condition code CCG and an ifun of 5 are returned. In this case, *IONUMBER* contains the MPE File System number associated with the completed I/O-without-wait request. The default is that no file number is returned.

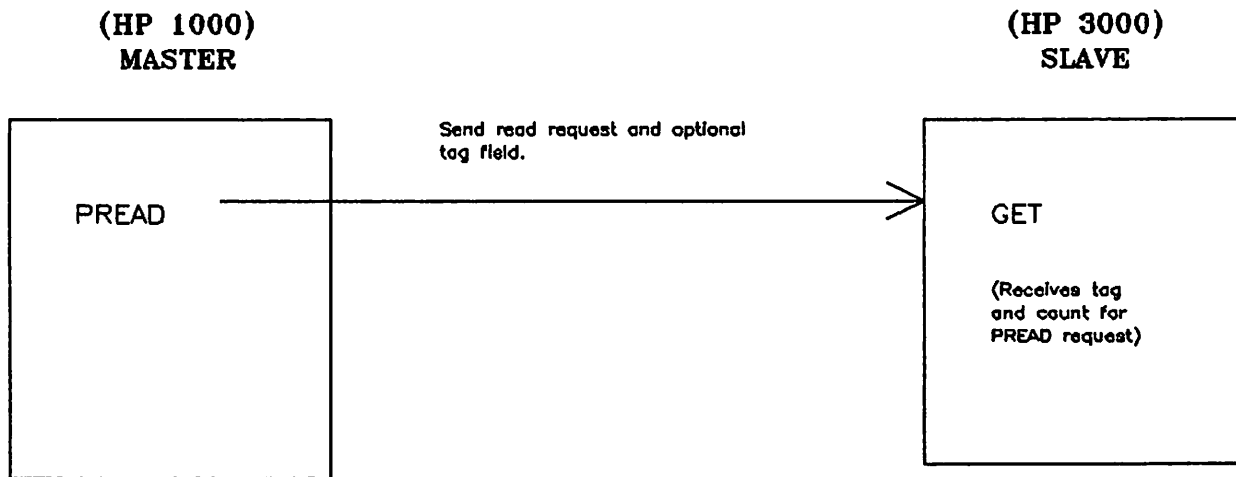


Figure 6-3. GET Activity with PREAD

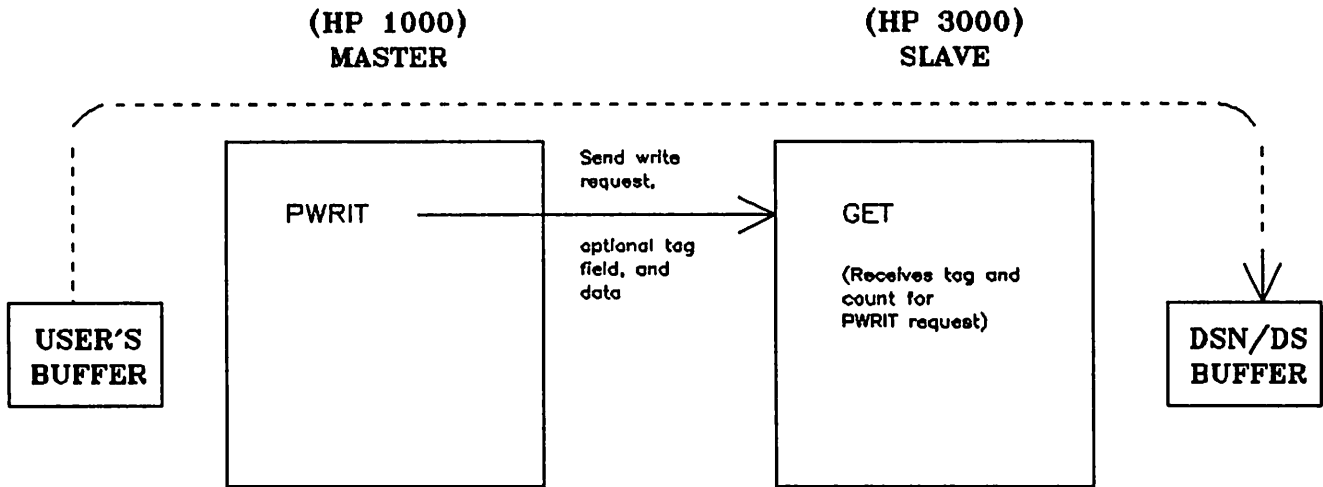


Figure 6-4. GET Activity with PWRIT

## Error Conditions

CCE	Request received successfully.
CCG	The implicit IOWAIT(0) call issued by the GET intrinsic completed a pending MPE File System I/O-without-wait request instead of a DS remote I/O request. The parameter, <i>IONUMBER</i> , contains the file number associated with the completed file system request.
CCL	An error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

### NOTE

You must not use IOWAIT(0) calls within a program containing DS GET calls. If you were to use an IOWAIT(0) call and it responded to a DS remote I/O request, your program would not be able to understand the information returned by the IOWAIT call.



# PCHECK

Returns an integer code specifying the completion status of the most recently executed DSN/DS program-to-program intrinsic. The PCHECK intrinsic may be used in both the master and slave programs.

## Syntax

```
I          IV  
icode: = PCHECK (DSNUM);
```

## Functional Return

When the PCHECK intrinsic is executed, it returns to the calling program a number, *icode*, that specifies the completion status of the most recently executed DS program-to-program intrinsic. The values of *icode* and the associated meanings are described in Appendix A.

## Parameters

*DSNUM* Integer by value (required). In a master program, *DSNUM* is the link identifier returned by the particular POPEN intrinsic that initiated communications with the remote slave program. In a slave program, *DSNUM* is 0 (zero).

## Error Conditions

- CCE PCHECK request successfully completed.
- CCG Not returned.
- CCL PCHECK request denied because *DSNUM* was invalid.

Master callable. Terminates program-to-program communication with a remote HP 1000 slave program. The DS line remains open.

## Syntax

```
IV  
PCLOSE (DSNUM);
```

## Parameters

*DSNUM* Integer by value (required). The line number returned by the particular POPEN intrinsic call which initiated communication with the remote HP 1000 slave program.

## Error Conditions

**CCE** Successful completion.

**CCG** Not returned.

**CCL** Request denied; an error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

### NOTE

Although a master program normally signals the slave program to terminate by generating a code in the tag field, PCLOSE can be used to terminate the slave program unconditionally. However, make certain the HP 1000 slave program is not communicating with other master programs, since PCLOSE turns off the slave to other master programs also.

# PCONTROL

Master callable. Exchanges tag fields with the remote HP 1000 slave program.

## Syntax

```
PCONTROL (DSNUM[IV IA O-V]ITAG);
```

The PCONTROL intrinsic optionally transmits a tag field to the remote HP 1000 slave program and accepts one in return. The remote HP 1000 slave program must issue a GET intrinsic call followed by either an ACCEPT or REJCT call to complete the PCONTROL operation. Both the ACCEPT and REJCT calls transmit a tag field back to the master program, available in *ITAG*.

Although this intrinsic was designed specifically to exchange tag fields, you will notice that *ITAG* is an optional parameter. If the master program did not transmit a tag field, then the returned tag field, if any, is not accessible.

The PCONTROL activity is described in Figure 6-5.

## Parameters

<i>DSNUM</i>	Integer by value (required). The link identifier returned by the particular POPEN intrinsic call which initiated communication with the remote HP 1000 slave program.
<i>ITAG</i>	Integer array (optional). A 20-word array used for transmitting and receiving a tag field. The format of the tag field is defined by the master and slave programs of the user.

## Error Conditions

CCE	Request accepted by remote HP 1000 slave program.
CCG	Request rejected by remote HP 1000 slave program.
CCL	Request denied; an error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

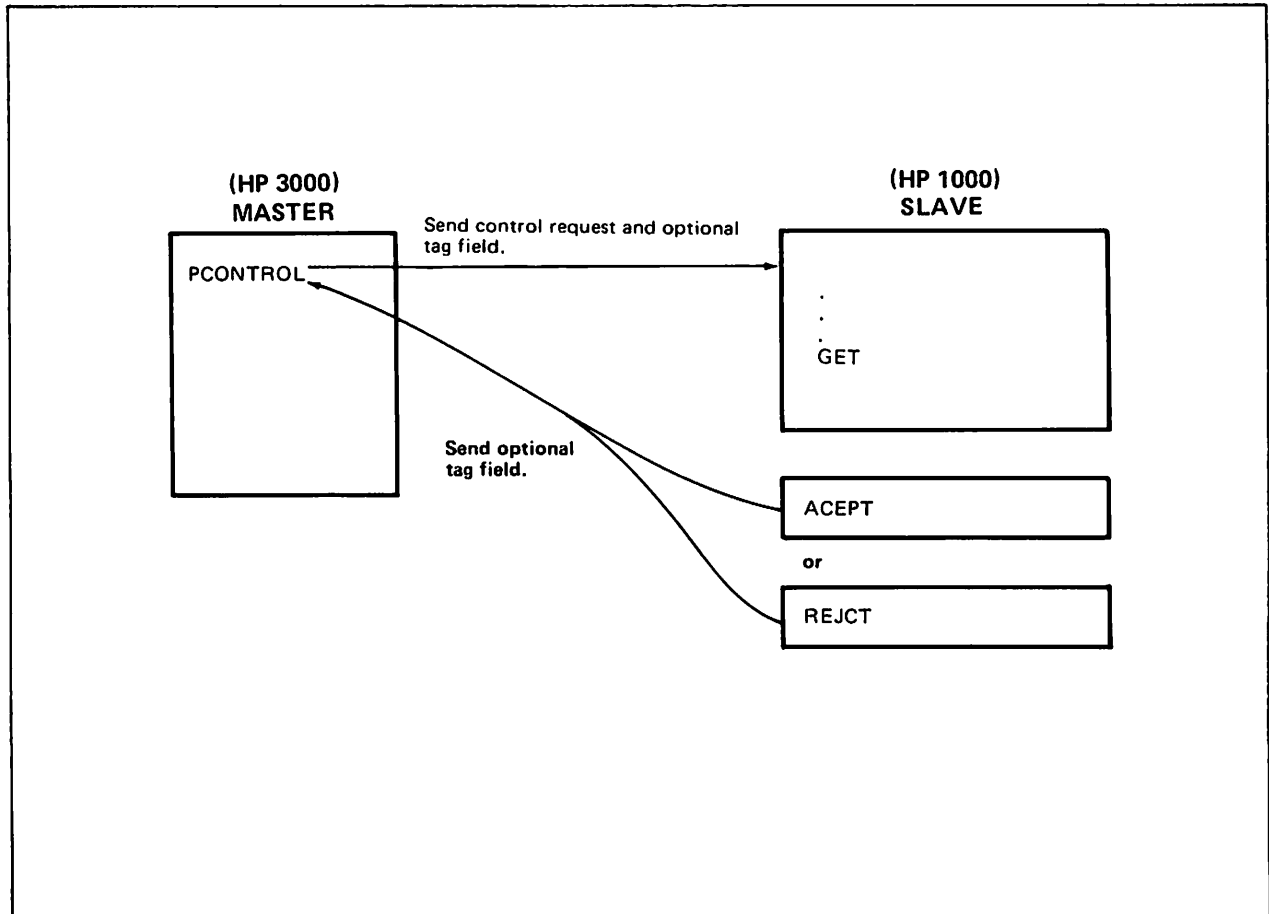


Figure 6-5. PCONTROL Activity

# POPEN

Master callable. Initiates program-to-program communication with a remote slave program.

## Syntax

```

      I          BA      BA      IA      BA      IV      IV
dsnum: = POPEN (DSDEVICE,PROGNAME[ITAG][ENTRYNAM][PARAM][FLAGS]
               [STACKSIZE][DLSIZE][MAXDATA][BUFSIZE]);

```

The POPEN intrinsic activates a slave program in the remote HP 1000 having the specified program name, *PROGNAME*, and optionally transmits a tag field, *ITAG*, to that remote HP 1000 slave program.

The remote HP 1000 slave program must issue a GET intrinsic call followed by either an ACCEPT or REJECT call to complete the POPEN operation.

The remote HP 1000 slave program may transmit a tag field back to the master program as part of an ACCEPT or REJECT call. If the master program transmitted a tag field, then the returned tag field, if any, is available in *ITAG*. If the master program did not transmit a tag field, then the returned tag field, if any, is not accessible.

The remote HP 1000 slave program remains activated and the communications link intact even if the POPEN request is rejected by the remote HP 1000 slave program. The meaning of a POPEN reject by the remote HP 1000 slave program must be established as part of the user application design.

## Functional Return

When the POPEN intrinsic is executed, it returns to the master program a number, *dsnum*, by which DS uniquely identifies the particular communications link. The POPEN activity described below is illustrated in Figure 6-6.

## Parameters

- DSDEVICE*                   Byte array (required). Contains a string of ASCII characters terminated by a space. This string must be the DS device class name, logical device number, or node name for DS/X.25 for the communications line you will be using to access the remote HP 1000.
- PROGNAME*                   Byte array (required). Contains a string of up to five ASCII characters that names a remote HP 1000 slave program.
- ITAG*                        Integer array (optional). A 20-word array used for transmitting and receiving tag fields. The format of the tag field is defined as part of the user application. Default: A tag field of all zeros is sent; the returned tag field, if any, is not available to the master program.

ENTRYNAME  
 PARAM  
 FLAGS  
 STACKSIZE  
 DLSIZE  
 MAXDATA

These are all MPE parameters used to specify program loading. They are ignored when the slave system is an RTE system. The commas must be included however since these are positional parameters.

BUFSIZE

Integer by value (optional). The size in words of the communications buffer (DSN/DS buffer) that is established by the remote DSN/DS software. Note that this parameter defines the maximum number of words of data that can be transmitted by a PWRITE or PREAD intrinsic call. In the default condition, this value is the same size as the line buffer defined by the DSLINE command (*LINEBUF=*) for the first DSLINE issued to the dsdevice. It will never be smaller than 304 words. If no *LINEBUF=* is specified by the first DSLINE command, then the default configuration length is used. Must be equal to 138 for X.25. This parameter must be specified for a buffer of 342 words or greater.

## Error Conditions

CCE

Request accepted by remote HP 1000 slave program.

CCG

Request rejected by remote HP 1000 slave program.

CCL

Request denied; an error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

# POPEN

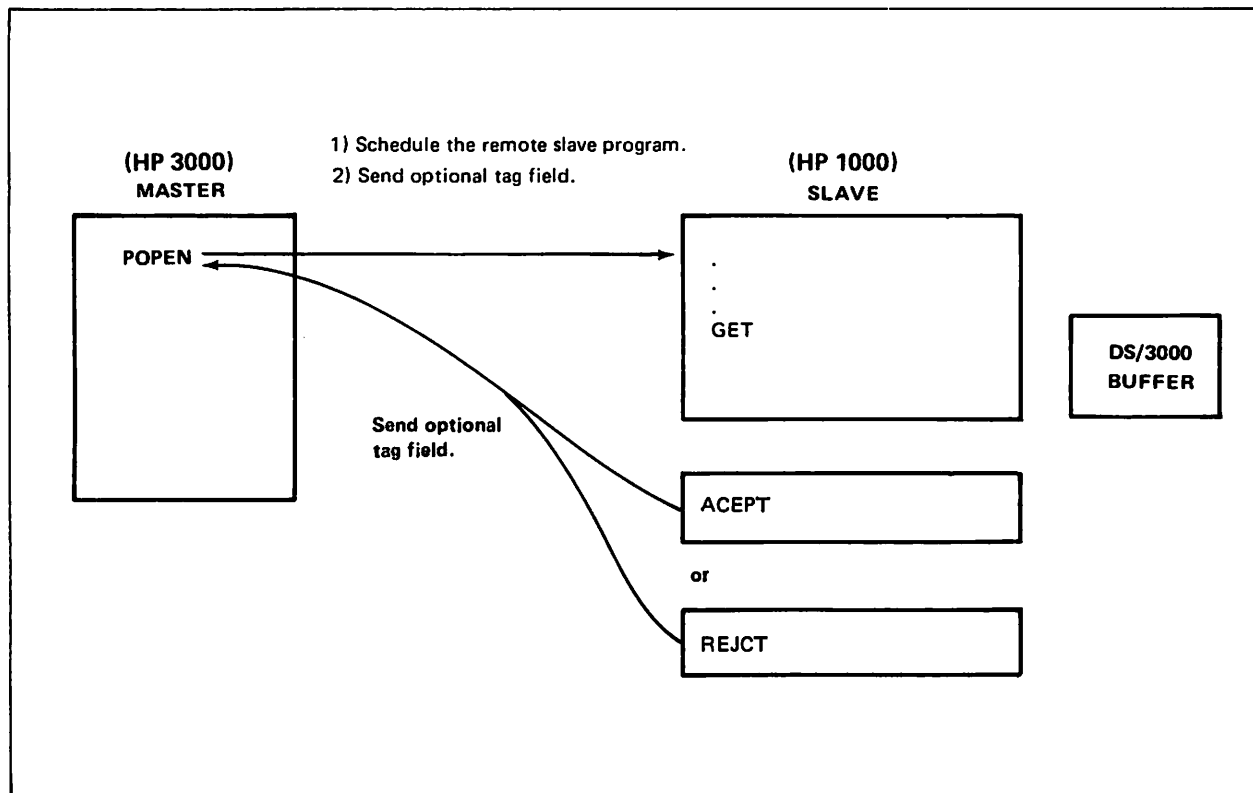


Figure 6-6. POPEN Activity

Master callable. Asks the remote slave program to send a block of data.

## Syntax

```

I           IV   IA   IV   IA   O-V
lgth: = PREAD (DSNUM,TARGET,TCOUNT[,ITAG]);

```

The PREAD intrinsic transmits a read request to the remote HP 1000 slave program and optionally transmits a tag field from *ITAG* to the remote HP 1000 slave program. The remote HP 1000 slave program must issue a GET intrinsic call followed by either an ACCEPT or REJCT call to complete the PREAD operation.

The ACCEPT call moves the requested block of data from the user's buffer in the remote HP 1000 system to *TARGET* in the master program.

The REJCT call transmits no data, other than an optional tag field.

The remote HP 1000 slave program may transmit a tag field back to the master program as part of the ACCEPT or REJCT call. If the master program transmitted a tag field, then the returned tag field, if any, is available in *ITAG*. If the master program did not transmit a tag field, then the returned tag field, if any, is not accessible.

## Functional Return

When the PREAD intrinsic is executed, it returns to the master program a number, *lgth*, specifying how many words (if *TCOUNT* is positive) or bytes (if *TCOUNT* is negative) of data were actually received into *TARGET*. The PREAD activity is illustrated in Figure 6-7.

## Parameters

<i>DSNUM</i>	Integer by value (required). The link identifier returned by the particular POPEN intrinsic call that initiated communication with the remote slave program.
<i>TARGET</i>	Integer array (required). The array into which data received from the remote slave program will be deposited.
<i>TCOUNT</i>	Integer by value (required). The positive number of words of data or the negative number of bytes of data requested. Data buffer sizes can be up to 512, 1024, or 4096 depending on the buffer size library generated in to the HP 1000 system to which the DS line is opened. See the <i>DS/1000-IV Network Manager's Manual</i> for details.
<i>ITAG</i>	Integer array (optional). A 20-word array used for sending and receiving a tag field. The format of the tag field is defined by the master and slave programs of the user.



# PREAD

## Error Conditions

- CCE Request accepted by the remote HP 1000 slave program.
- CCG Request rejected by the remote HP 1000 slave program.
- CCL Request denied; an error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

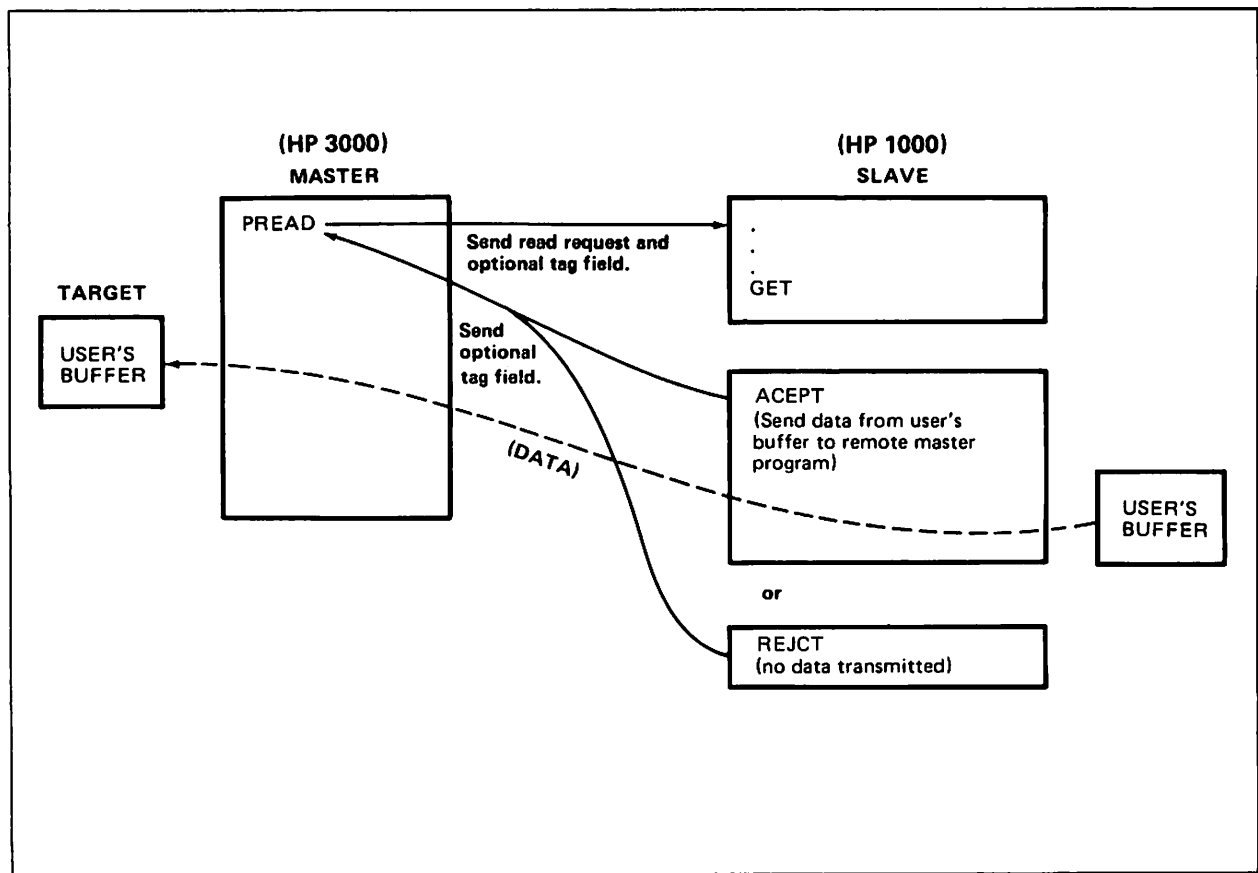


Figure 6-7. PREAD Activity

Master callable. Sends a block of data to the remote HP 1000 slave program.

## Syntax

```
          IV   IA   IV   IA   O-V  
PWRITE (DSNUM, TARGET, TCOUNT[ITAG]);
```

The PWRITE intrinsic transmits a block of data from *TARGET*, and optionally transmits a tag field, *ITAG*, to the remote HP 1000 slave program. The number of words or bytes to be transmitted is specified in *TCOUNT*. The maximum number of words that may be transferred is 4096.

The remote slave program must issue a GET call prior to accepting or rejecting the PWRITE request. GET returns information to the slave program concerning the nature of the master request, such as the length of the PWRITE data. The HP 1000 slave program may optionally receive the PWRITE information with the call to GET or wait until calling ACCEPT. The remote HP 1000 slave program must issue a GET call followed by either an ACCEPT or REJCT call to complete the PWRITE operation.

The remote HP 1000 slave program may transmit a tag field back to the master program as part of the ACCEPT or REJCT call. If the master program transmitted a tag field, then the returned tag field, if any, is available in *ITAG*. If the master program did not transmit a tag field, then any returned tag field is not accessible.

The PWRITE activity is illustrated in Figure 6-8.

## Parameters

<i>DSNUM</i>	Integer by value (required). The link identifier returned by the particular POPEN intrinsic call which initiated communication with the remote HP 1000 slave program.
<i>TARGET</i>	Integer array (required). The array from which data is transmitted to the remote HP 1000 slave program.
<i>TCOUNT</i>	Integer by value (required). The positive number of words of data to be transmitted or the negative number of bytes. Data buffer sizes can be up to 512, 1024, or 4096 words depending on the buffer size library generated in to the HP 1000 that the DS line is open to. See the <i>DS/1000-IV Network Manager's Manual</i> for details.
<i>ITAG</i>	Integer array (optional). A twenty-word array used for sending and receiving a tag field. The format of the tag field is defined by the master and slave programs of the user.

# PWRITE

## Error Conditions

- CCE Request accepted by remote HP 1000 slave program.
- CCG Request rejected by remote HP 1000 slave program.
- CCL Request denied; an error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

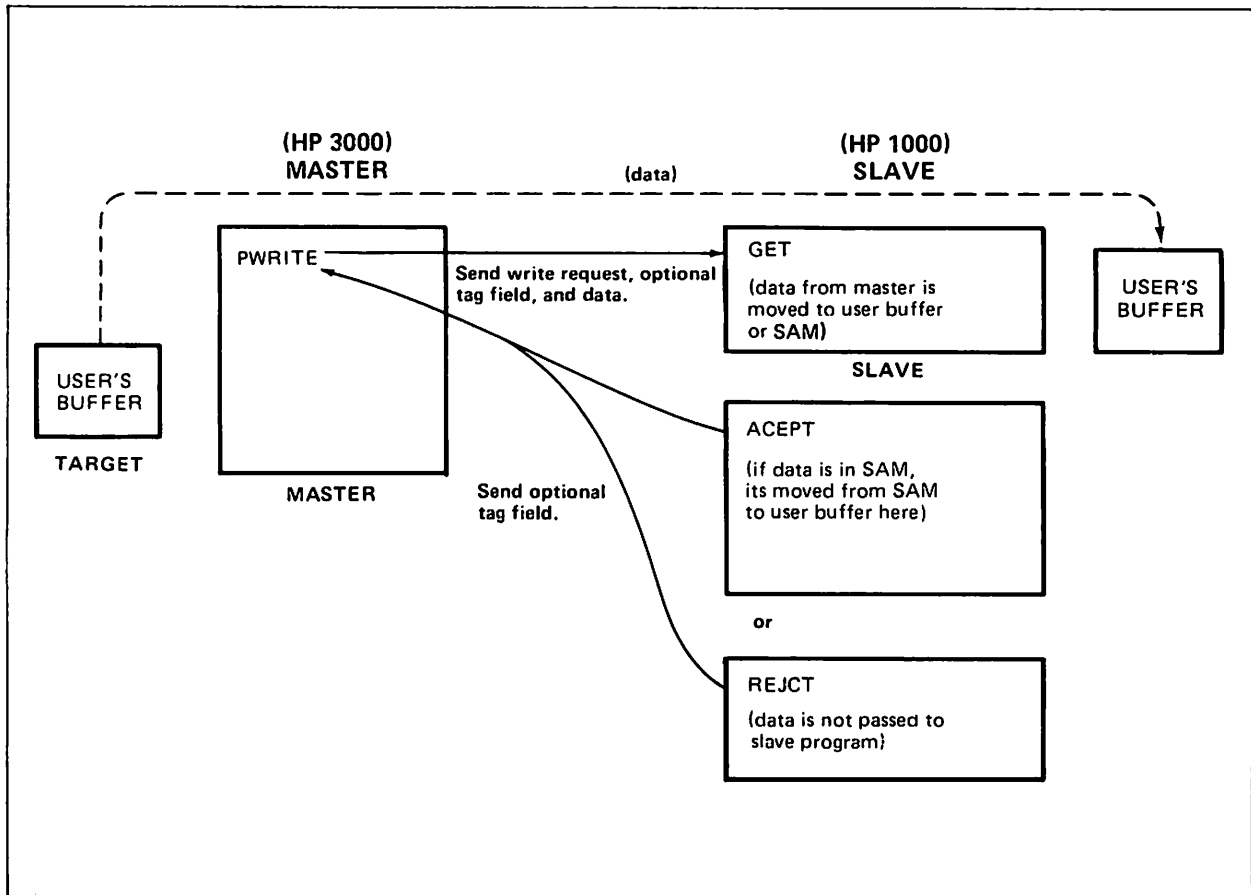


Figure 6-8. PWRITE Activity.

# REJECT

Rejects the request received by the most recent GET intrinsic call and returns an optional tag field back to the remote HP 1000 master program.

## Syntax

```
REJECT ( [ IA O-V ] [ ITAG ] );
```

## Parameters

*ITAG* Integer array (optional). A 20-word array used for transmitting a tag field. The format of the tag field is defined by the master and slave programs of the user.

## Error Conditions

CCE Response transmitted successfully to the remote HP 1000 master program.

CCG Not returned.

CCL An error occurred. Issue a PCHECK intrinsic call to determine the DSN/DS/3000 subsystem or MPE file system error code.

### NOTE

See Figures 6-1 and 6-2 which appear in the discussion of ACCEPT.

# PROGRAM EXAMPLES

The following are examples of master program and slave program pairs. The examples include an HP 3000 master - HP 1000 slave pair and an HP 1000 master - HP 3000 slave pair. See the *DS/1000-IV User's Manual* for details on the HP 1000 PTOP calls.

## Example 1: HP 3000 Master - HP 1000 Slave

### Master Program on the HP 3000

This is a master program (JMAST) that runs on the HP 3000 and sends a buffer to a slave program on the HP 1000 where it is reversed and sent back.

```
$CONTROL USLINIT
```

```
BEGIN
```

```
COMMENT
```

```
THIS HP 3000 MASTER PROGRAM PROMPTS THE USER FOR A BUFFER  
BE SENT TO THE REMOTE HP 1000 SLAVE PROGRAM WHERE THE BUFFER  
IS REVERSED. THE HP 3000 THEN READS THE REVERSED BUFFER BACK  
AND PRINTS IT ON THE USER'S TERMINAL. ALL COMMUNICATION IS  
ACCOMPLISHED USING THE PTOP INTRINSICS.;
```

```
INTEGER DSNUM, ICODE, LGTH;
```

```
BYTE ARRAY BUFFER(0:79);  
BYTE ARRAY DSLINE(0:7):="151      ";  
BYTE ARRAY MSG(0:79);  
BYTE ARRAY PROGNAME(0:5):="JSLAV ";
```

```
ARRAY IBUF(*)=BUFFER;  
ARRAY MSGI(*)=MSG;
```

```
INTEGER ARRAY ITAG(0:19);
```

```
INTRINSIC READ,PRINT,ASCII;  
INTRINSIC POPEN,PREAD,PWRITE,PCONTROL,PCHECK;
```

```
PROCEDURE ERRORPROC(CC);  
VALUE CC;  
INTEGER CC;
```

```
BEGIN
```

```
IF CC=-1 THEN
```

```
  BEGIN
```

```
    ICODE:=PCHECK(DSNUM);  
    MOVE MSG(0):=" ";  
    MOVE MSG(1):=MSG(0),(79);  
    MOVE MSG(0):="PTOP REQUEST FAILED.  ERROR = ";  
    ASCII(ICODE,10,MSG(30));
```

## PROGRAM EXAMPLES

```
        PRINT(MSGI,-33,0);
    END;

    IF CC=1 THEN
        BEGIN
            MOVE MSG:="REMOTE REJECTED REQUEST";
            PRINT(MSGI,-23,0);
        END;

    END;

<<BEGIN MAIN CODE>>

<<POPEN REMOTE HP 1000 SLAVE PROGRAM>>

DSNUM:= POPEN(DSLINE,PROGNAME,ITAG);
IF < THEN
    BEGIN
        ERRORPROC(-1);
        GO TO ENDIT;
    END
    ELSE IF > THEN
        BEGIN
            ERRORPROC(1);
            GO TO ENDIT;
        END
    ELSE
        BEGIN
            MOVE MSG:="POPEN SUCCESSFUL";
            PRINT(MSGI,-16,0);
        END;

<<PROMPT USER FOR BUFFER>>

MOVE MSG:="ENTER BUFFER FOR TEST";
PRINT(MSGI,-21,0);
LGTH:=READ(IBUF,40);

<<SEND BUFFER TO REMOTE>>

ITAG(0):=LGTH;
PWRITE(DSNUM,IBUF,LGTH,ITAG);
IF < THEN
    BEGIN
        ERRORPROC(-1);
        GO TO ENDIT;
    END
    ELSE IF > THEN
        BEGIN
            ERRORPROC(1);
            GO TO ENDIT;
        END
    ELSE
        BEGIN
```

## PROGRAM EXAMPLES

```
        MOVE MSG:="PWRITE SUCCESSFUL";
        PRINT(MSGI,-17,0);
    END;
<<GET REVERSED BUFFER FROM REMOTE>>

LGTH:=PREAD(DSNUM,IBUF,40,ITAG);
IF < THEN
    BEGIN
        ERRORPROC(-1);
        GO TO ENDIT;
    END
ELSE IF > THEN
    BEGIN
        ERRORPROC(1);
        GO TO ENDIT;
    END
ELSE
    BEGIN
        MOVE MSG:="PREAD SUCCESSFUL";
        PRINT(MSGI,-16,0);
        PRINT(IBUF,LGTH,0);
    END;

<<SEND PCONTROL TO TELL SLAVE TO ABORT ITSELF>>

ENDIT:

PCONTROL(DSNUM,ITAG);

END.
```

Slave Program on the HP 1000

The following is the HP 1000 slave program that is associated with the HP 3000 master program, JMAST, previously illustrated.

```

FTN7X
      PROGRAM JSLAV
C
C  SLAVE.  GET BUFFER, REVERSE IT, AND SEND BACK
C
      INTEGER BUF(40),P(2),CLASS,TAG(20),BUFR(40)
C
      CALL RMPAR(P)
      CLASS = P(1)
C
1    CALL GET(CLASS,IER,IFUN,TAG,IL)
      GOTO (10,20,30,40) IFUN
C
C  OPEN
C
10   CALL ACCEPT(TAG,IER)
      GOTO 1
C
C  READ
C
20   CALL ACCEPT(TAG,IER,BUFR)
      GOTO 1
C
C  WRITE
C
30   CALL ACCEPT(TAG,IER,BUF)
C
C  REVERSE BUFFER
C
      DO 31 I = 1,TAG(1)
          J=TAG(1)-I+1
          BUFR(J)=BUF(I)
31   CONTINUE
      GOTO 1
C
C  CONTROL
C
40   CALL ACCEPT(TAG,IER)
      CALL FINIS
      END

```



# PROGRAM EXAMPLES

## Example 2: HP 1000 Master – HP 3000 Slave

### Master Program on the HP 1000

This is a master program that runs on the HP 1000 and sends a buffer to a slave program on the HP 3000 where it is reversed and sent back.

```
PROGRAM JMAST
C
C THIS PROGRAM PROMPTS FOR AN INPUT BUFFER ON THE HP 1000, SENDS
C THE BUFFER TO A SLAVE PROGRAM ON AN HP 3000 WHICH REVERSES THE
C ORDER AND SENDS IT BACK AT THE REQUEST OF THE 1000 MASTER.
C
C INTEGER P(5),SNAM(3),BUF(40),PCB(4),TAG(20),AB(2),BUF1(40)
C INTEGER LOGON(7),PRMT(6)
C EQUIVALENCE(REG,AB)
C
C SNAM = THE NAME OF THE HP 3000 SLAVE PROGRAM
C LOGON = THE CHARACTER STRING FOR INITIATING A LOGON REQUEST
C TO THE HP 3000 OPERATING SYSTEM
C PRMT = THE PROMPT ON THE HP 1000 TO INPUT THE BUFFER TO BE
C REVERSED
C
C DATA SNAM/6HJSLAV /,LOGON/14HELLO RON.DS /
C DATA PRMT/12HINPUT BUFFER/
C
C INITIATE A SESSION ON THE HP 3000 WITH A CALL TO HELLO
C THE LINK LU OF THE HP 3000 IN THIS CASE IS LU 94
C
C CALL HELLO (IERR,94,1,NMSMP,LOGON,14)
C
C SCHEDULE THE SLAVE PROGRAM ON THE HP 3000
C
C CALL POPEN(PCB,IER,SNAM,-94,TAG)
C IF (IER .LT. 0) WRITE (1,7) IER,1
C 7 FORMAT (" IERR= ",I4," CALL TYPE: ",I2)
C
C PROMPT FOR THE BUFFER TO BE REVERSED
C 40 CHARACTERS MAXIMUM
C
C REG = DEXEC(-1,1,1+4400B,BUF,40,PRMT,6)
C
C SEND THE BUFFER TO THE HP 3000 SLAVE PROGRAM
C THE LENGTH OF THE BUFFER IS IN THE FIRST WORD OF TAG
C
C TAG(1) = AB(2)
C CALL PWRITE (PCB,IER,BUF,AB(2),TAG)
C
C READ THE REVERSED BUFFER BACK FROM THE HP 3000 SLAVE
```

## PROGRAM EXAMPLES

```
C LENGTH OF THE BUFFER IS 40 CHARACTERS
C
IL = 40
CALL PREAD (PCB,IER,BUF1,IL,TAG)
IF (IER .LT. 0) WRITE (1,7) IER,2
C
C PRINT THE RETURNED BUFFER
C
WRITE (1,9) BUF1
9 FORMAT("BUFFER IS ",/,40A2)
C
C CALL PCONT TO TELL THE SLAVE PROGRAM YOU ARE DONE
C
CALL PCONT (PCB,IER,TAG)
C
C CALL BYE TO LOG OFF THE CREATED HP 3000 SESSION ESTABLISHED
C IN THE CALL TO HELLO
C
CALL BYE (IERR,94,1,NMSMP)
END
```

# PROGRAM EXAMPLES

## Slave Program on the HP 3000

The following is the HP 3000 slave program that is associated with the HP 1000 master program, JMAST, previously illustrated.

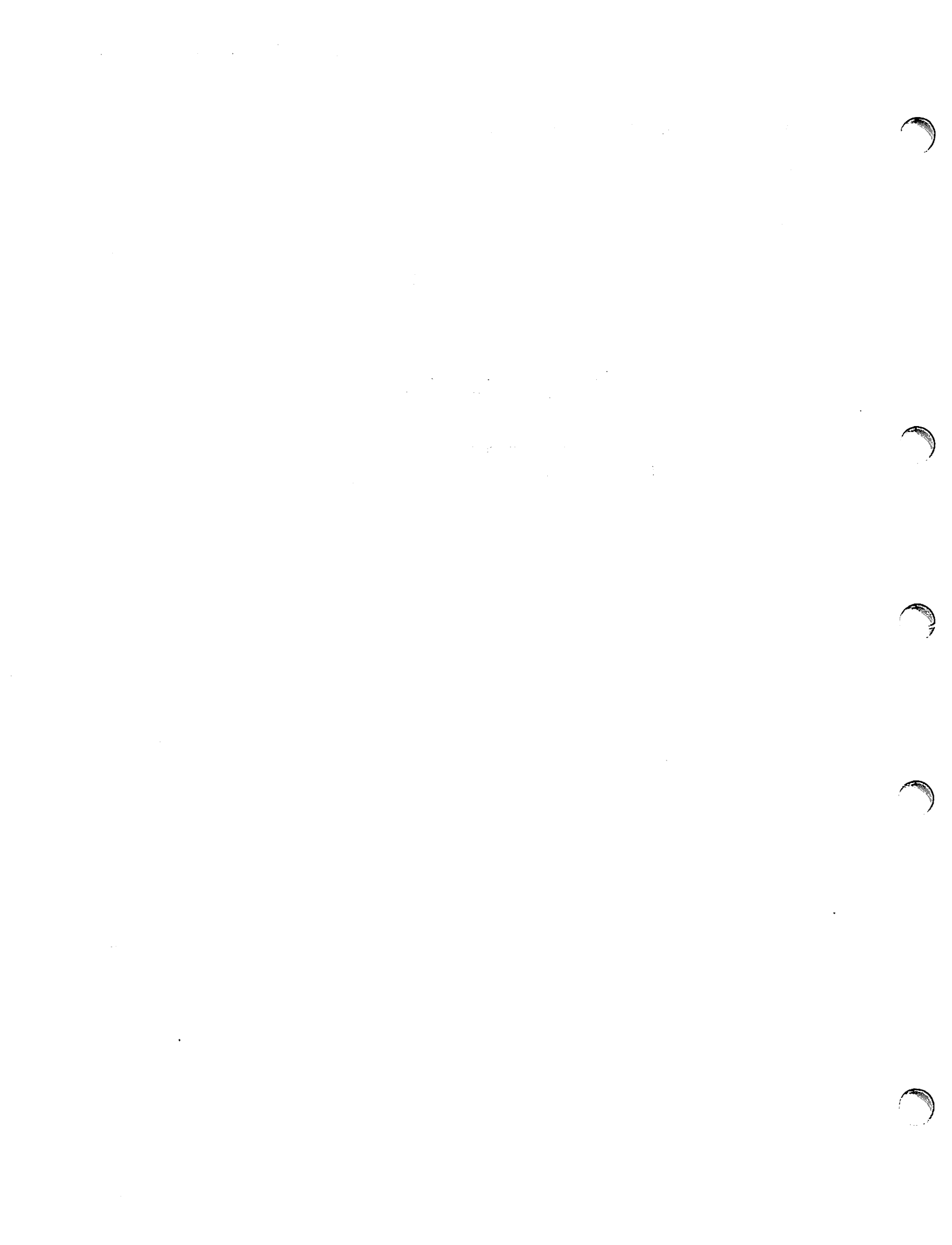
```
$CONTROL USLINIT
    PROGRAM JSLAV
C
C   DECLARE THE PTOP SUBROUTINE CALLS AS SYSTEM INTRINSICS.
C
C   SYSTEM INTRINSIC GET,ACCEPT,REJECT
    INTEGER BUF(40),P(2),CLASS,TAG(20),BUFR(40)
C
C   INVOKE THE GET FUNCTION TO WAIT FOR MESSAGES FROM THE
C   MASTER PROGRAM ON THE HP 1000
C
C   1   IFUN = GET(TAG,IL,IONUMB)
C
C   BRANCH TO THE APPROPRIATE PIECE OF SLAVE CODE TO HANDLE THE
C   FUNCTION CODE RETURNED FROM THE GET
C
C   FUNCTION CODES ARE:
C       1 = POPEN, 2 = PREAD, 3 = PWRIT, 4 = PCONT, 5 = NO WAIT I/O
C
C   GOTO (10,20,30,40,50),IFUN
C
C   POPEN CALL...CALL ACCEPT TO MASTER
C   AND PERFORM ERROR CHECKING
C
C   10  CALL ACCEPT(TAG)
        IF (.CC.)11,1,1
C   11  IER = PCHECK(0)
        WRITE (6,1000) IER,1
        GOTO 1
C
C   PREAD CALL..CALL ACCEPT TO RETURN REVERSED BUFFER AND DO
C   ERROR CHECKING
C
C   20  CALL ACCEPT(TAG,BUFR,TAG(1))
        IF (.CC.)21,1,1
C   21  IER = PCHECK(0)
        WRITE (6,1000) IER,2
        GOTO 1
C
C   PWRITE CALL..CALL ACCEPT TO RETRIEVE BUFFER TO BE REVERSED AND
C   DO ERROR CHECKING
C
C   30  CALL ACCEPT(TAG,BUF,40)
        IF (.CC.)31,33,33
C   31  IER = PCHECK(0)
        WRITE (6,1000) IER,3
```

## PROGRAM EXAMPLES

```
C
C REVERSE RETRIEVED BUFFER IN DO LOOP
C
33 DO 32 I = 1, TAG(1)
    J = TAG(1) - I + 1
    BUFR(J) = BUF(I)
32 CONTINUE
    GOTO 1

C
C PCONTROL CALL..CALL ACCEPT AND STOP PROGRAM
C
40 CALL ACCEPT(TAG)
    STOP

C
C NO WAIT I/O CALL ENCOUNTERED AT GET FUNCTION
C DISPLAY ERROR INFORMATION AND RETURN TO GET FUNCTION
C
50 DISPLAY "GET DONE ON NO WAIT I/O, WHICH IS NOT A "
    DISPLAY "DS FUNCTION. RETURN TO GET "
    DISPLAY "FILENUMBER = ", IONUMB
1000 FORMAT ("PTOP ERROR. IERR = ", I5, " CALL TYPE: ", I2)
    GOTO 1
    END
```



# ERROR CODES AND MESSAGES

APPENDIX

A

The following is a summary of the messages that may be encountered together with their meanings. The messages, as listed here, have been grouped according to their associated activities. For this reason, some messages are listed under more than one heading.

Communications link errors may appear while using the :DSLIN command, Remote File Access (RFA), or program-to-program intrinsics. The method of reporting depends on the operation in progress when an error occurs.

If you are performing remote FMP access, the error is returned in the error parameter.

If you are using DEXEC calls, the error is returned as a four character ASCII code in the A and B registers.

If you are using program-to-program operations, the error code is returned by the PCHECK intrinsic.

# DSN/DS/3000 SUBSYSTEM

## :DSLIME Syntax Errors

These messages are sent to the terminal user to point out an error in syntax or to warn of the consequences of a request.

- 1300 REMOTE JOBS ARE NOT ALLOWED !. (CIERR 1300)
- 1301 DSLIME CANNOT CONTAIN BOTH OPEN AND CLOSE. (CIERR 1301)
- 1302 DSLIME REQUIRES AT LEAST ONE PARAMETER. (CIERR 1302)
- 1303 DSNUMBER SPECIFICATION MUST BE A NUMBER FROM 1 THRU 255. (CIERR 1303)
- 1304 DSLIME #L! DOES NOT IDENTIFY AN OPEN DS LINE. (CIERR 1304)
- 1305 EXPECTED LINEBUF, PHNUM, IOCID, REMID, OPEN, CLOSE, QUIET, COMP, NOCOMP, OR EXCLUSIVE. (CIERR 1305)
- 1306 MULTIPLE USE OF ! IS NOT ALLOWED. (CIERR 1306)
- 1307 THE SYNTAX FOR ! REQUIRES AN = SIGN FOLLOWED BY DATA. (CIERR 1307)
- 1308 PHNUM IS 1 TO 20 DIGITS AND DASHES. (CIERR 1308)
- 1309 ! LIST CAN CONTAIN ONLY ONE ELEMENT. (CIERR 1309)
- 1310 THE SPECIFIED LOGICAL DEVICE IS NOT OPEN. (CIERR 1310)
- 1311 THE FIRST CHARACTER OF AN ID SEQUENCE MUST BE A " OR A ( (CIERR 1311)
- 1312 THE ID SEQUENCE MUST TERMINATE WITH A ). (CIERR 1312)
- 1313 THE ID SEQUENCE MUST TERMINATE WITH A ". (CIERR 1313)
- 1314 A NUMERIC ID SEQUENCE ELEMENT MUST BE 1 THRU 255 (OR %377). (CIERR 1314)
- 1315 LINEBUF MUST BE A NUMERIC VALUE FROM 304 THRU 4096. (CIERR 1315)
- 1316 UNABLE TO COMPLETE THE REMOTE COMMAND. (CIERR 1316)
- 1317 NOT A CURRENTLY AVAILABLE DSLIME. (CIERR 1317)
- 1318 USE OF EXCLUSIVE REQUIRES BOTH NS AND CS CAPABILITY. (CIERR 1318)
- 1319 THE DS LINE #L! IS IN USE BY A PROGRAM OR SUBSYSTEM AND CANNOT BE CLOSED. (CIERR 1319)
- 1320 EXPECTED A RESPONSE OF YES, Y, NO, OR N. (CIERR 1320)
- 1321 UNABLE TO OPEN THE DS LINE ON DEVICE !. (CIERR 1321)
- 1322 @ IS INVALID IN THIS CONTEXT. (CIERR 1322)

## DSN/DS/3000 SUBSYSTEM

- 1323 A DSLINE OPEN REQUIRES A VALID DS DEVICE NAME AS THE FIRST PARAMETER.  
(CIERR 1323)
- 1324 FROM ADDRESS MUST BE BETWEEN 1 AND 14 CHARACTERS INCLUSIVE. (CIERR 1324)
- 1325 TO ADDRESS MUST BE BETWEEN 1 AND 14 CHARACTERS INCLUSIVE. (CIERR 1325)
- 1326 FROM AND TO ADDRESS MUST BE A DECIMAL NUMBER. (CIERR 1326)
- 1389 INVALID OR MISSING DELIMITER FOR SELECTION SIGNAL SEQUENCE. (CIERR 1389)
- 1390 SELECTION SIGNAL SEQUENCE MUST BE FROM 1 TO 30 CHARACTERS. (CIERR 1390)
- 1391 BOTH QUEUE AND NONQUEUE SPECIFIED; NONQUEUE USED. (CIWARN 1390)
- 1392 ONLY ! WORDS WERE ALLOCATED FOR THE LINE BUFFER. (CIWARN 1392)
- 1393 COMPRESSION REQUEST NOT HONORED. REMOTE DOES NOT SUPPORT THIS FEATURE.  
(CIWARN 1393)
- 1394 COMPRESSION PARAMETER RESPECIFIES AND OVERRIDES PREVIOUS COMPRESSION  
PARAMETER. (CIWARN 1394)
- 1395 OPEN PARAMETERS ENTERED ON A CLOSE REQUEST ARE IGNORED (CIERR 1395)
- 1396 AN ID LIST MUST CONTAIN 255 OR LESS ELEMENTS. (CIWARN 1396)
- 1397 AN UNNECESSARY DELIMITER IS IGNORED. (CIWARN 1397)
- 1398 THERE ARE NO DS LINES OPEN. (CIWARN 1398)
- 1399 MULTIPLE USE OF ! IS REDUNDANT AND IGNORED. (CIWARN 1399)

### DSN/DS Functional Errors

These messages report a functional problem within the system.

- 201 REMOTE DID NOT RESPOND WITH THE CORRECT REMOTE ID. (DSERR 201)
- 202 SPECIFIED PHONE NUMBER IS INVALID. (DSERR 202)
- 203 REMOTE ABORT/RESUME NOT VALID WHEN DOING PROGRAM-TO-PROGRAM COMMUNICATION.  
USE LOCAL ABORT/RESUME. (DSWARN 203)
- 204 UNABLE TO ALLOCATE AN EXTRA DATA SEGMENT FOR DS/3000. (DSERR 204)
- 205 UNABLE TO EXPAND THE DS/3000 EXTRA DATA SEGMENT. (DSERR 205)
- 206 SLAVE PTOP FUNCTION ISSUED FROM A MASTER PROGRAM. (DSERR 206)
- 207 SLAVE PTOP FUNCTION OUT OF SEQUENCE. (DSERR 207)



## DSN/DS/3000 SUBSYSTEM

- 208 MASTER PTOP FUNCTION ISSUED BY A SLAVE PROGRAM. (DSERR 208)
- 209 SLAVE PROGRAM DOES NOT EXIST OR IS NOT PROGRAM FILE. (DSERR 209)
- 210 WARNING -- INVALID MAXDATA OR DLSIZE FOR A SLAVE PROGRAM. SYSTEM DEFAULTS ARE IN EFFECT. (DSWARN 210)
- 211 SLAVE ISSUED A REJECT TO A MASTER PTOP OPERATION. (DSWARN 211)
- 212 FILE NUMBER FROM IOWAIT NOT A DS LINE NUMBER. (DSWARN 212)
- 213 EXCLUSIVE USE OF A DS LINE REQUIRES BOTH ND AND CS CAPABILITY. (DSERR 213)
- 214 THE REQUESTED DS LINE HAS NOT BEEN OPEN WITH A USER :DSLIN COMMAND OR A REQUIRED :REMOTE HELLO HAS NOT BEEN DONE. (DSERR 214)
- 215 DSLIN CANNOT BE ISSUED BACK TO THE MASTER COMPUTER. (DSERR 215)
- 216 MESSAGE REJECTED BY THE REMOTE COMPUTER. (DSERR 216)
- 217 INSUFFICIENT AMOUNT OF USER STACK AVAILABLE. (DSERR 217)
- 218 INVALID PTOP FUNCTION REQUESTED. (DSERR 218)
- 219 MULTIPLE POPEN. ONLY ONE MASTER PTOP OPERATION CAN BE ACTIVE ON A DS LINE. (DSERR 219)
- 220 PROGRAM EXECUTING GET WAS NOT CREATED BY POPEN. (DSERR 220)
- 221 INVALID DS MESSAGE FORMAT. INTERNAL DS ERROR. (DSERR 221)
- 222 MASTER PTOP FUNCTION ISSUED PRIOR TO A POPEN. (DSERR 222)
- 223 REQUEST TO SEND MORE DATA THAN SPECIFIED IN POPEN. (DSERR 223)
- 224 FILE EQUATIONS FOR A REMOTE FILE CONSTITUTE A LOOP. (DSERR 224)
- 225 CANNOT ISSUE POPEN TO A SLAVE SESSION IN BREAK MODE. (DSERR 225)
- 226 SLAVE PROGRAM HAS TERMINATED BEFORE EXECUTING "GET". (DSERR 226)
- 227 REMOTE HELLO MUST BE DONE TO INITIATE REMOTE SESSION. DSERR 227)
- 228 EXCEEDED MAXIMUM NUMBER OF VIRTUAL CHANNELS PER JOB. (DSERR 228)
- 229 TOO MANY DS USERS ON THIS SYSTEM. CANNOT OBTAIN A VIRTUAL PROCESS NUMBER. (DSERR 229)
- 231 INVALID FACILITY IN CONNECTION REQUEST. (DSERR 231)
- 232 THE REMOTE COMPUTER IS NOT OBTAINABLE. (DSERR 232)
- 233 VIRTUAL CIRCUIT IS NOT OBTAINABLE. (DSERR 233)

## DSN/DS/3000 SUBSYSTEM

- 234 QUEUEING IS REQUIRED TO COMPLETE THE REQUEST. (DSERR 234)
- 235 DS MESSAGE SEQUENCING ERROR. (DSERR 235)
- 236 COMMUNICATIONS HARDWARE HAS DETECTED AN ERROR. (DSERR 236)
- 237 CANNOT CURRENTLY GAIN ACCESS TO THE TRACE FILE. (DSERR 237)
- 238 COMMUNICATIONS INTERFACE ERROR. INTERNAL FAILURE. (DSERR 238)
- 239 COMMUNICATIONS INTERFACE ERROR. TRACE MALFUNCTION. (DSERR 239)
- 240 LOCAL COMMUNICATION LINE WAS NOT OPENED BY OPERATOR. (DSERR 240)
- 241 DS LINE IN USE EXCLUSIVELY OR BY ANOTHER SUBSYSTEM. (DSERR 241)
- 242 INTERNAL DS SOFTWARE ERROR ENCOUNTERED. (DSERR 242)
- 243 THE REMOTE COMPUTER IS NOT RESPONDING. (DSERR 243)
- 244 COMMUNICATIONS INTERFACE ERROR. THE REMOTE COMPUTER RESET THE LINE.  
(DSERR 244)
- 245 COMMUNICATIONS INTERFACE ERROR. RECEIVE TIMEOUT. (DSERR 245)
- 246 COMMUNICATIONS INTERFACE ERROR. REMOTE DISCONNECTED. (DSERR 246)
- 247 COMMUNICATIONS INTERFACE ERROR. LOCAL TIME OUT. (DSERR 247)
- 248 COMMUNICATIONS INTERFACE ERROR. CONNECT TIME OUT. (DSERR 248)
- 249 COMMUNICATIONS INTERFACE ERROR. REMOTE REJECTED CONNECTION. (DSERR 249)
- 250 COMMUNICATIONS INTERFACE ERROR. CARRIER LOST. (DSERR 250)
- 251 COMMUNICATIONS INTERFACE ERROR. LOCAL DATA SET FOR THE DS LINE WENT NOT  
READY. (DSERR 251)
- 252 COMMUNICATIONS INTERFACE ERROR. HARDWARE FAILURE. (DSERR 252)
- 253 COMMUNICATIONS INTERFACE ERROR. NEGATIVE RESPONSE TO THE DIAL REQUEST BY  
THE OPERATOR. (DSERR 253)
- 254 COMMUNICATIONS INTERFACE ERROR. INVALID I/O CONFIGURATION. (DSERR 254)
- 255 COMMUNICATIONS INTERFACE ERROR. UNANTICIPATED CONDITION. (DSERR 255)
- 256 REQUEST QUEUED BEHIND PREVIOUS REQUEST. (DSERR 256)

# DSN/DS/3000 SUBSYSTEM

## :DSCONTROL Informatory Messages

These messages convey status information.

- 300 DS DEVICE !: MASTER AND SLAVE ACCESS SHUT.
- 301 DS DEVICE !: SLAVE ACCESS OPENED; MASTER ACCESS SHUT.
- 302 DS DEVICE !: MASTER ACCESS OPENED; SLAVE ACCESS SHUT.
- 303 DS DEVICE !: MASTER AND SLAVE ACCESS OPENED.
- 304 DS DEVICE !: TRACE ACTIVATED USING TRACE FILE !.
- 305 DS DEVICE !: TRACE DEACTIVATED.
- 306 DS DEVICE !: MONITORING ACTIVATED.
- 307 DS DEVICE !: MONITORING DEACTIVATED.
- 308 DS DEVICE !: DEBUG MODE ACTIVATED.
- 309 DS DEVICE !: DEBUG MODE DEACTIVATED.
- 310 DS DEVICE !: SPECIAL DEBUG MODE ACTIVATED.
- 311 DS DEVICE !: DEFAULT MODE IS NO COMPRESSION.
- 312 DS DEVICE !: DEFAULT MODE IS COMPRESSION.
- 313 DS DEVICE !: RETRY COUNT NOW EQUALS !.
- 314 DS DEVICE !: CALL REQUEST CANCELLED.

## :DSCONTROL Error Messages

These messages point out an error in syntax or warn of the consequences of a request.

- 4100 NUMBER OF PARAMETERS EXCEEDS MAXIMUM OF !. (CIERR 4100)
- 4101 EXPECTED AT LEAST TWO PARAMETERS: A DS DEVICE CLASS/NUMBER AND A FUNCTION KEYWORD. (CIERR 4101)
- 4102 EXPECTED A DEVICE CLASS NAME OR LOGICAL DEVICE NUMBER FOR ONE OR MORE DS DEVICES. (CIERR 4102)
- 4103 USER IS NOT ASSOCIATED WITH DS DEVICE !. NO CONTROL FUNCTIONS EXECUTED FOR THIS DEVICE. (CIWARN 4103)
- 4104 USER IS NOT ALLOWED TO USE :DSCONTROL AND IS NOT ASSOCIATED WITH THE DS DEVICE(S). (CIERR 4104)

## DSN/DS/3000 SUBSYSTEM

- 4105 EXPECTED ONE OR MORE OF THE CONTROL FUNCTIONS: OPEN, SHUT, MON, MOFF, COMP, NOCOMP, TRACE, OR DEBUG. (CIERR 4105)
- 4106 INVALID CONTROL FUNCTION. EXPECTED ONE OF: OPEN, SHUT, MON, MOFF, COMP, NOCOMP, TRACE, OR DEBUG. (CIERR 4106)
- 4107 MASTER OVERRIDES PREVIOUS MASTER/SLAVE OPTION. (CIWARN 4107)
- 4108 SLAVE OVERRIDES PREVIOUS MASTER/SLAVE OPTION. (CIWARN 4108)
- 4109 SPEED OPTION OVERRIDES PREVIOUS SPEED OPTION. (CIWARN 4109)
- 4110 OPEN OVERRIDES PREVIOUS OPEN/SHUT FUNCTION. (CIWARN 4110)
- 4111 SHUT OVERRIDES PREVIOUS OPEN/SHUT FUNCTION. (CIWARN 4111)
- 4112 TRACE OVERRIDES PREVIOUS TRACE FUNCTION(S). (CIWARN 4112)
- 4113 DEBUG OVERRIDES PREVIOUS DEBUG FUNCTION(S). (CIWARN 4113)
- 4114 MON OVERRIDES PREVIOUS MON/MOFF FUNCTION. (CIWARN 4114)
- 4115 MOFF OVERRIDES PREVIOUS MON/MOFF FUNCTION. (CIWARN 4115)
- 4116 COMP OVERRIDES PREVIOUS COMP/NOCOMP FUNCTION. (CIWARN 4116)
- 4117 NOCOMP OVERRIDES PREVIOUS COMP/NOCOMP FUNCTION. (CIWARN 4117)
- 4118 EXPECTED A ";" , ", " , OR RETURN AS DELIMITER. (CIERR 4118)
- 4119 EXPECTED EITHER A ";" OR RETURN AS DELIMITER. (CIERR 4119)
- 4120 EXPECTED A "=" AS DELIMITER FOR SPEED OPTION. (CIERR 4120)
- 4121 EXPECTED A ", " AS DELIMITER BETWEEN OPTIONS. (CIERR 4121)
- 4122 ILLEGAL OPEN/SHUT OPTION. EXPECTED ONE OF: MASTER, SLAVE, SPEED, OR LINESPEED VALUE. (CIERR 4122)
- 4123 EXPECTED A POSITIVE DOUBLE VALUE FOR LINESPEED. (CIERR 4123)
- 4124 CS CAPABILITY REQUIRED TO USE :DSCONTROL. (CIERR 4124)
- 4125 PM CAPABILITY REQUIRED TO USE DEBUG FUNCTION. (CIERR 4125)
- 4126 DEBUG FUNCTION MAY ONLY BE USED BY SYSTEM CONSOLE. (CIERR 4126)
- 4127 EXPECTED NO OPTION FOR DEBUG OR ONE OF THE FOLLOWING: ON, OFF, OR POSITIVE INTEGER VALUE. (CIERR 4127)
- 4128 EXPECTED NO OPTION FOR MON/MOFF OR ONE OF THE FOLLOWING: CS OR DS. (CIERR 4128)
- 4129 COMP/NOCOMP FUNCTIONS HAVE NO OPTIONS. (CIERR 4129)

## DSN/DS/3000 SUBSYSTEM

- 4130 SPEED OPTION IGNORED FOR SHUT FUNCTION. (CIWARN 4130)
- 4131 EXTRANEOUS ";" IGNORED. POSSIBLE MISSING FUNCTION? (CIWARN 4131)
- 4132 EXTRANEOUS "," IGNORED. POSSIBLE MISSING OPTION? (CIWARN 4132)
- 4133 CREATION OF DS MONITOR PROCESS FAILED. (CIERR 4133)
- 4134 PROGRAM FILE "DSMON.PUB.SYS" MISSING. (CIERR 4134)
- 4135 DS MONITOR UNABLE TO RUN AS A SYSTEM PROCESS. (CIERR 4135)
- 4136 CS DEVICE ! IS UNAVAILABLE FOR USE. (CIERR 4136)
- 4137 DS DEVICE MUST BE OPEN PRIOR TO USE. (CIERR 4137)
- 4138 USER SPECIFIED TRACE FILE NOT ALLOWED WHEN MORE THAN ONE DEVICE IN DEVICE CLASS. (CIERR 4138)
- 4139 DS DEVICE ! CURRENTLY CONTROLLED ELSEWHERE. (CIWARN 4139)
- 4140 DS DEVICE !: OPEN/SHUT NOT EXECUTED DUE TO ABOVE. (CIWARN 4140)
- 4141 DS DEVICE !: TRACE NOT EXECUTED DUE TO ABOVE. (CIWARN 4141)
- 4142 DS DEVICE !: MON/MOFF NOT EXECUTED DUE TO ABOVE. (CIWARN 4142)
- 4143 DS DEVICE !: COMP/NOCOMP NOT EXECUTED DUE TO ABOVE. (CIWARN 4143)
- 4144 DS DEVICE !: DEBUG NOT EXECUTED DUE TO ABOVE. (CIWARN 4144)
- 4145 NO DS DEVICES REMAINING TO BE CONTROLLED. (CIWARN 4145)
- 4146 RETRY OVERRIDES PREVIOUS RETRY FUNCTION. (CIWARN 4146)
- 4147 EXPECTED AN "=" AS DELIMITER FOR RETRY FUNCTION. (CIERR 4147)
- 4148 INVALID RETRY COUNT, MUST SPECIFY "DEFAULT" OR A NUMBER BETWEEN 0 AND 255 INCLUSIVE. (CIERR 4148)
- 4149 DS DEVICE !: RETRY NOT EXECUTED DUE TO ABOVE. (CIWARN 4149)
- 4150 DS INTERNAL FIX NUMBERS DIFFER. (CIWARN 4150)
- 4151 INCOMPATIBLE OR MISSING NONCRITICAL DS MODULE: DSCOPY, DSTEST, DS2026, OR DS2026CN. (CIWARN 4151)
- 4152 CRITICAL DS MODULES ARE INCOMPATIBLE, NO CONTROL FUNCTIONS EXECUTED. (CIERR 4152)
- 4153 MISSING CRITICAL DS SOFTWARE, NO CONTROL FUNCTIONS EXECUTED. (CIERR 4153)
- 4154 TOO MANY DS USERS ON THIS SYSTEM. CANNOT OBTAIN A VIRTUAL PROCESS NUMBER. (CIERR 4154)

## DSN/DS/3000 SUBSYSTEM

- 4155    PROMPT OVERRIDES PREVIOUS PROMPT FUNCTION(S).    (CIERR 4155)
- 4180    REDUNDANT SPECIFICATION OF CANCEL OPTION IGNORED.    (CIWARN 4180)
- 4181    CANCEL OPTION HAS NO PARAMETERS.    (CIERR 4181)
- 4182    DS DEVICE ! IS NOT AN X.21 DEVICE; CANCEL NOT EXECUTED.    (CIWARN 4182)
- 4183    NO CALL REQUEST FOR DE DEVICE !.    (CIWARN 4183)

## RFA ERRORS

These error messages may returned in the *IERR* parameter if the condition code = CCE.

Error Code	Meaning	Corrective Action
000	No error.	None.
-001	The disc is down.	Try again and then report it to the system manager of the facility.
-002	A file already exists with the specified name.	Repeat with a new name or purge the existing file.
-003	An attempt was made to backspace a device or type 0 file that cannot be backspaced.	Check the device type.
-004	An attempt was made to create a type 2 file with too many records, or the record size was too large.	Check the size parameter.
-005	An attempt was made to read or position a record not written; or, on update, to write an illegal record length.	Check the position or size parameters.
-006	An attempt was made to access a cartridge or file that cannot be found, or that has no more room.	Check the file name or cartridge number. If there is no more room on the cartridge, try another or decrease the file size.
-007	An attempt was made to access a file with no security or the wrong code.	Find out the correct code and use it or do not access the file.
-008	An attempt was made to open a file that was already opened exclusively, or to open eight programs, or the cartridge containing the file is locked.	Use CL or DL to locate the lock. If the file is being packed, check to see if the spool is shut down.
-009	An attempt was made to position a type 0 file with DPOSN or to force a type 0 file to a type 1.	Check the file type.
-010	Required parameters were omitted from the call.	Enter the parameters.
-011	An attempt was made to access an unopened DCB.	Use CREATE or OPEN to open DCB; check for errors.
-012	An attempt was made to read, write, or position beyond the file boundaries.	Check the record position parameters; the result depends on the file type and call.

## RFA ERRORS

Error Code	Meaning	Corrective Action
-013	The cartridge is locked.	Initialize the cartridge if it is not currently initialized; otherwise keep trying.
-014	No more room in the file directory.	Purge the files and pack the directory if possible, or try another cartridge.
-015	The file name does not conform to the syntax rules.	Make corrections to the name.
-016	Wrong type of code supplied; an attempt was made to create or purge a type 0 file or to create a 0-length file.	Check the size and type parameters.
-017	An attempt was made to read, write, or position a type 0 file that does not support the operation.	Check the file parameters, from FMGR check the name.
-018	The destination node does not have FMP.	
-025	Bad FCODE. Internal RFAM error.	
-026	Incorrect entry number in RFAM. DCB destroyed.	
-028	There isn't any internal table space in RFAM.	
-029	Internal RFAM tables are invalid.	
-053	Illegal record size.	
-057	System table error.	
-059	Illegal or missing parameters.	



## RFA ERRORS

These error messages may be returned in the *IERR* parameter if the condition code = CCL, otherwise the error code is a DSN/DS/3000 subsystem error or an MPE file system error.

Error Code	Meaning
3	Not enough parameters.
5	Parameter address violation at the HP 3000.
72	Invalid DS line.

## DEXEC ERRORS

If the condition code = CCG, these four-character ASCII codes are returned in a double word ABREG.

Error Code	Meaning
DS03	Illegal record size.
DS06	Illegal request.
DS07	System table error.
DS09	Illegal or missing parameters.
I001	Illegal or missing parameters.
I002	Illegal logical unit.
I003	Logical unit not assigned.
I004	Illegal user buffer.
I007	Call rejected by the driver.
I012	LU not available to user's session.
SC01	Missing parameter.
SC02	Illegal parameter.
SC03	Program cannot be scheduled.
SC05	Program cannot be defined.
SC06	There is no resolution in the DEXEC TIME call.

## DEXEC ERRORS

If the condition code = CCL, then a double word ABREG may be one of these binary values, otherwise the error code is a DSN/DS/3000 subsystem error or an MPE file system error.

Error Code	Meaning
3	Not enough parameters.
5	Parameter address violation at the HP 3000.
72	Invalid DS line.

If condition code = CCE the DEXEC call completed satisfactorily.

# DSCONTROL CONSOLE COMMAND

APPENDIX

**B**

Before establishing a DSN/DS communications link, the console :DSCONTROL command must be used to OPEN a line so that it is available to DSN/DS users. The :DSCONTROL command allows you to enable or disable the DSN/DS subsystem on a specific communications link.

For easy reference, this command is shown in the following format:

- **SYNTAX**                      Shows the format of the command.
- **PARAMETERS**                Describes the variables in the command.
- **OPERATION**                  Describes the command in detail.
- **EXAMPLES**                   Shows the command in use.

# :DSCONTROL

## Syntax

```
:DSCONTROL dsdevice [;function [;... function]]
```

where the parameter, *function*, has the following meanings:

```
[ ;OPEN [ ,MASTER ] [ , [SPEED=] speed ] ]  
;SHUT [ ,SLAVE ] ]
```

```
[ ;TRACE [ ,ON [ ,ALL ] [ ,mask ] [ ,numentries ] [ ,WRAP ] [ ,filename ] ] ]  
;OFF ]
```

```
[ ;MON [ ,DS ] ]  
;MONOFF [ ,CS ] ]
```

```
[ ;RETRY={DEFAULT }  
count ]
```

## Parameters

*dsdevice*

Required parameter. The logical device number or the device class name of the DSN/DS communications device (IODS0 or IODSX). On your system's I/O configuration listing, the device is back referenced by a pound sign (#) to a previously defined INP, HSI, or SSLC.

OPEN

For bisync DSN/DS (IODS0), the DS subsystem is enabled but no activity is initiated on the communications link. For DS/X.25 (IODSX), the DS subsystem establishes a communications link with the PDN. Makes the line available for remote communication via the DSN/DS Subsystem.

SHUT

Initiates an orderly line shutdown. Refer to OPERATION for details about the line closing procedure.

**MASTER** Limits DSN/DS line activity to outgoing requests only. No incoming sessions are allowed.

**SLAVE** Limits DSN/DS line activity to incoming requests only; no outgoing activity is allowed.

Default: Both MASTER and SLAVE processing are allowed.

*linespeed*

Transmission rate in characters per second (Bit Rate/8). This parameter is effective only if your system configuration for the line selected SPEED CHANGEABLE. Specify *linespeed* if yours is a European installation with modems running at half speed, or if the line is hardwired and you want to override the configured default. It may be necessary to include this parameter if the length of cables used for HSI communications has been changed since the system was configured.

HSI speed: 250 000 (cable lengths less than 1000 ft.)

125 000 (cable lengths greater than 1000 ft.)

INP or SSLC speed: 250, 300, 600, or 1200

INP only speed: 2400 (RS232) or 7000 (direct connect on V. 35)

The SPEED= keyword in the OPEN option may be omitted from a :DSCONTROL command. For example, the following two commands have exactly the same effect:

```
:DSCONTROL 60;OPEN,MASTER,SPEED=250000
```

```
:DSCONTROL 60;OPEN,MASTER,250000
```

Remember, both ends of the line must operate at the same speed.

Default: System configuration values.

**TRACE,ON** Activates the TRACE facility to provide a record of communications activities. Trace parameters are positional. The line must already be open, or the OPEN keyword must also be included (to open the line).

**ALL** Generates trace records for all line activity.

Default: Records are written only for transmission errors.

*mask* An octal number preceded by a percent sign (%*nn*). Used to select type of trace entries generated. Refer to Sections 3 and 4 in the *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* for an explanation of the mask bits. Default: %37 (all except PSTN).

# :DSCONTROL

*numentries* Decimal integer for the maximum number of entries in a trace record, not greater than 248.  
Default: 24. (See OPERATION.)

## NOTE

When using DSN/X.25, there is not enough space left on the INP to trace using the default number of entries, 24. The user must specify *numentries* = 16.

WRAP Trace entries that overflow the trace record overlay the prior trace record entries.  
Default: Overflow entries are discarded.

*filename* A name for the trace file.  
Default: DSTRCxxx.PUB.SYS (where xxx is the LDEV of the *dsdevice*).

TRACE,OFF Deactivates the TRACE facility, so that no records are kept of DSN/DS actions, states, and events. Also closes the trace file.

MON [ ,DS ]  
[ ,CS ] Activates internal communication monitoring activity to give additional information on a subsequent cold dump of the system. The line must be open for the use of MON.

MON Requests monitoring of all levels of activity.

MON,DS Requests monitoring at the DSN/DS level of internal software operation.

MON,CS Requests monitoring at the Communication System level of internal software operation.

Default: No monitoring.

Used only for system troubleshooting.

MOFF Deactivates internal DSN/DS monitor records. Line must be open for the use of MOFF.

RETRY= [ DEFAULT  
count ]

Changes the communications error retry count to the specified value. The retry counter controls the number of times the system attempts to send or receive a message across the communications link.

**DEFAULT** Specifies a limit of 15 retries after a line error occurs.

**count** Can be any value within the range of 0 to 255.

Default: 15.

## Operation

Unless :DSCONTROL is issued from the master console, this command requires the user to have CS and ND capability. In addition, all users except the console operator are granted access to :DSCONTROL only if they are ALLOWed to use the command and are ASSOCIATED with the specified DS device.

Only one DSN/DS communications device can be active (OPEN) on a controller at any given time. Once opened (with the :DSCONTROL command), a communications link can be shared by multiple DSN/DS users. It cannot, however, be shared by users of other communications subsystems supported by your system (for example, DSN/MRJE). Thus, you must SHUT the DSN/DS communications device before the controller can be opened for use by another subsystem.

Before issuing a :DSCONTROL command, use the :SHOWDEV command to check whether a communications link is already established. The LDEV for the INP, SSLC, or HSI port will be UNAVAILable if the communications link is in use by any subsystem; the LDEV for a DSN/DS communication device, driver IODS0 or IODSX, will be AVAILable if it is currently OPEN for use by DSN/DS users.

If a DS device class includes more than one DS device, the functions specified in the :DSCONTROL command apply to all devices in that class.

If you include more than one function in a :DSCONTROL command, each function (with its subparameter list) must be separated by a semicolon. A function that duplicates or conflicts with a previous function overrides that function. Functions can appear in any order but are executed in the following order:

1. OPEN/SHUT
2. TRACE
3. MON/MOFF

The default name of the trace file is:

DSTRCxxxx.PUB.SYS

where *xxxx* is the logical device number of the *dsdevice*.

If no trace file exists when you turn on the trace facility and you do not specify *numentries*, the system creates a file to hold 24 entries in each record. If you are using DSN/X.25, however, you must specify *numentries* =16, because there is not enough space on the INP for 24.



## :DSCONTROL

When using the bisync protocol, the SHUT parameter initiates an orderly line closing procedure. If no sessions or applications are using the line when you shut it, line disconnection occurs immediately. If any user (including applications) has the line open, the line remains connected until all sessions and applications CLOSE the line, or until those accessing the line terminate or are aborted. Once SHUT by the console operator, no new users may access the line until the operator reopens it. When using the X.25 capability of DSN/DS, the SHUT parameter disconnects the line immediately, even if there are current users on the line.

### NOTE

Occasionally you may not be able to SHUT a standard (non-X.25) DS line. This could happen, for example, if a DS user forgot to issue a :DSLIN *xxx*;CLOSE command but still has a local session. It could also happen if a remote session is "hung." In such a situation, you can "kill" all activity across the line by issuing an :ABORTIO *xxx* (where *xxx* is the logical device number of the *dsdevice*). Following the use of the :ABORTIO *xxx* command, a second :DSCONTROL *xxx*;SHUT command will complete successfully.

## **Examples**

To open X.25 line number 55, thereby making it available for use by DSN/DS users, enter:

```
:DSCONTROL 55;OPEN
```

To permit the local HP 3000 to process only master (outgoing) requests on DS line number 55, enter:

```
:DSCONTROL 55;OPEN,MASTER
```

To activate the CS Trace facility for DS line 55 (the line is already open), enter:

```
:DSCONTROL 55;TRACE,ON,ALL
```

To open X.25 line 55 and activate CS Trace with a maximum of 250 entries in a trace record, enter:

```
:DSCONTROL 55;OPEN;TRACE,ON,,,250
```

To open the line named REMSYS and enable internal monitoring, enter:

```
:DSCONTROL REMSYS;OPEN;MON
```



This appendix provides a brief discussion on troubleshooting should a failure occur during HP 3000 to HP 1000 communications. Your primary source of information during the troubleshooting process will be the *DS/1000-IV Network Manager's Manual*, the *DSN/DS HP 3000 to HP 3000 User/Programmer Reference Manual*, and the *DSN/DS HP 3000 to HP 3000 Network Administrator Manual*. These three manuals contain discussions specific to the individual systems for tracing and troubleshooting.

In order to obtain meaningful troubleshooting information, both the sending and receiving ends must be traced. This allows you or an HP Systems Engineer (SE) to compare the message formats from both ends to ensure that the message was not altered during transmission of the message. The *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* and the *DS/1000-IV Network Manager's Manual* contain diagrams of the message formats.

## HP 3000 TROUBLESHOOTING AND TRACING

The DSLIST program is used to obtain a list of the software module version numbers for the DSN/DS, DSN/X.25, and CS modules installed on your system. This list is required for all troubleshooting activities and must accompany each Service Request (SR) that you submit to your HP Systems Engineer (SE).

In order to obtain the list, you must have READ access to the DSN/DS program files in PUB.SYS. The command syntax is:

```
:RUN DSLIST.PUB.SYS
```

DSTEST is a systems verification test used to check both the system software and the physical link between the computer systems. This test is accomplished by transmitting sample messages across the line using Remote File Access (RFA) or PTOP. With DSTEST you can select the number of passes, the word pattern to be transmitted, the mode of transmission, and the block size. See the *DSN/DS HP 3000 to HP 3000 User/Programmer Manual* for a more detailed discussion of DSTEST.

### NOTE

To perform DSTEST you must have established a link to a remote HP 1000 system using the :DSLIN command. In addition, when using RFA, the Remote File Access Monitor (RFAM) must have been scheduled by DINIT, the DS initialization program on the HP 1000. When using PTOP, the PTOP communication slave monitor (PTOPM) must be running and the slave program, DSTES (DSTEST is the master on the 3000), must be RP'd.

## Troubleshooting

The DSTEST program may be executed in two modes. To execute DSTEST in *diagnostic* mode, enter the following command:

:RUN DSTEST.PUB.SYS,DIAG

Then respond to the questions as follows:

- .RFA or PTOP?           Enter RFA for Remote File Access when testing the HP 1000 link. PTOP capability is supported to the HP 1000 if the slave (DSTES) is loaded there and PTOPM, the HP 1000 program-to-program slave monitor, was scheduled by DINIT.
- .REMOTE COMPUTER?       Enter 1000 (this question is only asked for RFA).
- .DSLIN?                 Enter the device class or logical device number of the DS line to be tested.
- .1000 FILE NAME?        Enter a file name of six or fewer characters, beginning with an alphabetic character. The file will be purged upon completion of DSTEST, assuming that the test was completed successfully (only asked for RFA).
- .NUMBER OF PASSES?     Enter the number of passes desired, up to a maximum of 32767. A zero or a carriage return causes a default value of one pass to be used.
- .PATTERN?               Enter an octal word to be transferred. The percent sign indicating octal (%) must be entered. An illegal input causes the message, INPUT ERROR, to be printed. Enter a correct value or a carriage return to indicate a default value, which is %177777.
- .BLOCK SIZE?            Enter the desired block size of the transfer. For the HP 1000 the block size must be less than 512 words. If a value greater than 512 is entered, an error message is printed.
- .CONTINUE(Y/N)?         Enter a Y to select another set of options, or N to terminate the test.

A second mode available for DSTEST is called the *default* mode. To initiate DSTEST in the default mode, enter the following:

:RUN DSTEST.PUB.SYS

You will then be prompted to enter the DS line you wish to test. DSTEST will then be initiated using one pass of PTOP and a 512 word buffer of all %177777's.

## DSTEST Examples

### DSTEST for PTOP

:DSLIN 141  
DS LINE NUMBER = #L3  
:RUN DSTEST.PUB.SYS,DIAG

```

HEWLETT PACKARD 32190A.04.04 DSTEST/3000 WED, SEP 7, 1983, 3:07 PM
.RFA OR PTOP? PTOP
.DSLINE? 141
.NUMBER OF PASSES? 1
.PATTERN? %1
.BLOCK SIZE? 128
128 WORD PROG TO PROG WRITES DONE: 1 ,SECS: 2.130 ,AVE: 2.130
.CONTINUE(Y/N)? N

END OF PROGRAM
:

```

### DSTEST for RFA

```

:DSLLINE 141
DS LINE NUMBER = #L3.
:RUN DSTEST.PUB.SYS,DIAG

```

```

HEWLETT PACKARD 32190A.04.04 DSTEST/3000 WED, SEP 7, 1983, 3:12 PM
.RFA OR PTOP? RFA
.REMOTE COMPUTER? 1000
.DSLINE? 141
.1000 FILE NAME? TEMP01
.NUMBER OF PASSES? 22
.PATTERN? %11
.BLOCK SIZE? 256
256 WORD REMOTE RECS WRITTEN/READ: 22 ,SECS: 42.012 ,AVE: 1.909
.CONTINUE (Y/N)? N

END OF PROGRAM
:

```

**TRACING FACILITY.** The CS/3000 Trace Facility available on the HP 3000 provides a record of the line actions, CS states, and events that occur during DSN/DS operations between computer systems.

This trace facility is invoked by the operator with a :DSCONTROL command when OPENing the communications line, or after the OPEN when the line is active. The CS/3000 Trace Facility will record the line activity for a particular communications line until either DSN/DS terminates or the operator issues a new :DSCONTROL command with the TRACE,OFF parameter.

See the *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* for specific instructions to invoke the CS/3000 Trace Facility.

**TRACE FORMATTING.** Once the line activity has been recorded using the CS/3000 Trace Facility, the data may be formatted for easier interpretation. There are two formatting programs for DS. They are CSDUMP and DSDUMP.

## Troubleshooting

CSDUMP does some formatting and displays *all* trace file data in raw form. DSDUMP allows you to choose a *subset* of the trace file to be formatted, and will also analyze the chosen data. In addition, CSDUMP will display all of the bisynchronous line protocol, while DSDUMP only displays the DS protocol.

See the *DSN/DS HP 3000 to HP 3000 Network Administrator Manual* for specifics to use CSDUMP and DSDUMP.

## HP 1000 TROUBLESHOOTING AND TRACING

There are two utility programs which should be run at the HP 1000 end to record, format, and analyze traffic sent over the HP 3000 to HP 1000 PSI and HSI communications link.

**TRACING FACILITIES.** LOG3K is a program which initializes logging and is run interactively to determine which device or spoolfile the HP 1000 to HP 3000 messages are to be logged. LOG3K is also used to determine what information is to be logged.

**Low Level Tracing For HSI.** The Synchronous Line Control Information (SLCIN) program tracks all driver activity (DV667) on the HSI card. Long term statistics and single events are listed. To use this program successfully, you need to have a strong understanding of bisync protocol.

**TRACE FORMATTING.** TRC3K is the utility program for the HP 1000 which allows you to examine the messages logged by LOG3K. These messages are formatted into readable form by TRC3K. TRC3K is similar in function to DSDUMP on the HP 3000 side with respect to its formatting function.

Refer to the *DS/1000-IV Network Manager's Manual* for a complete discussion of the use of these programs.

## Additional HP 1000 Troubleshooting Utilities

In addition to the previously discussed tracing and formatting utilities, DS/1000-IV provides two other utilities that you may find useful for network maintenance. These utilities are DSINF and DSMOD.

DSINF allows you to examine:

- The Available Memory Suspend list
- I/O classes in use
- DS Values, including Resource Numbers, Class Numbers assigned to DS programs, and time-out values
- The Transaction Control Blocks in the DS SAM block
- DS Lists
- Network Routing Vector Specifications

- DS Equipment Table entries
- Synchronous Link Control (DVG67) long term statistics
- Message Accounting Values
- Rerouting Values
- Remote Sessions active at this node

Once your node has been initialized, you may schedule DSMOD to make adjustments to parameters set during initialization. DSMOD allows you to change the HP 3000 ID sequence, re-enable a link, display the NRV, change the non-session password, quiesce the node, schedule additional monitors, adjust timing, change the default session user name, and change the Nodal Routing Vector.

Refer to the *DS/1000-IV Network Manager's Manual*, Vol I and II, for details on both DSINF and DSMOD.





This section contains information regarding applications on the DS 3000 to 1000 communications link. It provides various DS 3000 to 1000 specifications.

## Line Buffer Configuration Limits

### SOFTWARE

HP 3000                      256 - 4095 words

HP 1000                      The software is loaded using one of the 3 available Libraries.

                                 304 words maximum

                                 1072 words maximum

                                 4096 words maximum

<b>NOTE</b>
-------------

Continuation records will be used when the actual transmitted data exceeds the line buffer size.

The entire transfer includes user's data, plus the DS fixed part of the message format, plus an optional appendage.

### HARDWARE

HP 3000                      INP     304-1024 words maximum  
                                 HSI     304-4095 words maximum  
                                 SSLC    304-4095 words maximum

HP 1000                      PSI     1072 words maximum  
                                 HSI     4096 words maximum

## Opening a Line from the HP 3000

To open the DS line from the HP 3000 side, a `:DSCONTROL xxx;OPEN` is done from a system console. Then, the command `:DSLINe xxx` is done to open a line to the HP 1000. If the HP 1000 is not ready to accept a DSLINE, this will fail, and the message `REMOTE NOT RESPONDING` will appear. At this point the HP 1000 operator must be instructed to open the DS line from the HP 1000 side. To close a DS line, the command `:DSLINe xxx;CLOSE` is done. If an attempt at opening a DS line from the HP 3000 side fails, a `:DSLINe xxx;CLOSE` must be done before another attempt at opening the line can be accomplished.

## Opening a Line from the HP 1000

To open a line from the HP 1000 side, type the command `:RU,DINIT`. DINIT enables the communication line interface and schedules the DS monitor and queuing programs that service incoming requests from remote network nodes. DINIT schedules QUEX, which is a program used to exchange line open information with the HP 3000. After a period of time (if the line fails), QUEX goes into a secondary state, and will accept an incoming connection with a HP 3000. The HP 3000 side operator must type in a `:DSCONTROL xxx;OPEN`, before a line from the HP 1000 can be opened. To reinstate the HP 1000 side as a primary station (allowing you to make the connection from the HP 1000 side), type the command, `DSMOD/L`.

## Session

Some HP 1000s have the ability to offer users some isolation from other users through a capability called SESSION. SESSION provides a unique environment for each user, where capability levels, private disc space, device access, etc. can be specified for each logon account. For instance, if a user wishes to access a certain file which resides in a private disc area, the user must logon to an account which has access to that area of the disc.

When accessing an HP 1000 (with Session Monitor installed) from an HP 3000, you may wish to make the access under a session. This is done transparently to the HP 3000 user by providing a default logon for requests received from the HP 3000. The capability level, disc space, device access, etc. is set up for that default session by the HP 1000 Network Manager. This default logon is generally given low capabilities as a security measure. For most HP 3000 users, access will be made by interactively (HELLO), or programmatically (HELLO command) logging on to a specific account on the HP 1000. The HP 3000 user then has the capabilities of that specific logon. For example, if an HP 3000 user wishes to access data stored in a private file on the HP 1000, the user will have to issue a logon to a specific account that has access to that file before attempting to access the file with remote file access calls. For more details on session versus non-session access, refer to "Opening A Line" in Section 2 of this manual.

It is important to note that the session established on the HP 1000 is a non-interactive session. There is no FMGR associated with the session; so the only commands that can be processed are RTE system level commands, and DS level DEXEC, RFA, and PTOp calls.

## Running FMGR on the HP 1000

The only method for issuing remote FMGR commands on the HP 1000 is to place a FMGR transfer file on the HP 1000 and then issue the command `REMOTE RU,FMGR,trfile`. FMGR will run on the HP 1000, open the transfer file and execute the commands that it contains. The output of the FMGR will go to the system console of the HP 1000.

**CAUTION**

The request to RU,FMGR causes the actual FMGR program to run (not a copy of it). This will tie up FMGR until the transfer file has completed, and keep other users on the HP 1000 from logging on (they will not be able to get a copy of FMGR for their session). You must also be very careful to EX,SP from FMGR at the end of the transfer file or FMGR will be tied up to your session until you terminate it (BYE), or it times out. Exercise caution when running FMGR from the HP 3000.

**The MOve Command**

DS/1000-IV provides the ability to move files between HP 1000s and HP 3000s with a simple user command from RMOTE (the user interface program to the HP 3000). This capability requires master-slave software to be installed in both computers. The relocatable %RMOTE1 is a version of RMOTE that utilizes a slave program, called COPY3K.PUB.SYS on the HP 3000 to transfer files. The file transfer is accomplished with the RMOTE MO command. Refer to the RMOTE section of the *DS/1000-IV User's Manual* for more information.

**NOTE**

COPY3K must exist on the HP 3000 to use the RMOTE MO command. The *DS/1000-IV Network Manager's Manual*, Vol. I, contains installation instructions.

**PTOP Testing Using DSTEST**

DS/1000-IV provides a slave program, DSTES (%DSTES), which can be loaded on the HP 1000 for verification of the DS PTOP software. Load DSTES, and be sure that it is RPed (given an ID segment). From the HP 3000, open the DS line to the HP 1000 and run DSTEST for verification of the PTOP software. See Appendix C in this manual for more information.



DSN/DS operation requires the installation and configuration of one communications interface for each line to a remote computer.

This section explains how to configure the following:

## NOTE

Intelligent Network Processor (INP)

Synchronous Single-Line Controller (SSLC)

Hardwired Serial Interface (HSI)

DS Line Monitor (communications driver IODS0 or IODSX)

DS Virtual Terminals (IODSTRM0, IODSTRMX) -- one for each session that will be allowed on your system from a remote system.

The same communications interface (INP, SSLC, or HSI) can be used by another HP 3000 data communications subsystem (such as DSN/MRJE) when it is not being used by DSN/DS. In such a case, the communications interface is configured once for each subsystem (each time with a unique logical device number, but always with the same DRT number). Keep in mind that the following dialogue applies only when the interface is used for DSN/DS activity, and that a response that is optional for DSN/DS may not be optional for one of the other subsystems. Configuration guidelines pertaining to the other subsystems are given in the reference manual for each subsystem. Configuration summary tables for each of the communications interface types are included in the *Data Communications Handbook* and in the *HP 3000 Computer Systems, System Manager/System Supervisor Reference Manual (HP 3000 Computer Systems, MPE V System Operation and Resource Management Reference Manual, if you are using MPE V/E)*.

For any data communications subsystem to function, CS/3000 modules must be present on the system. It is presumed in this configuration description that the HP Systems Engineer (SE) has already installed CS/3000.

If you are making any other changes to the MPE I/O system, refer to the *System Manager/System Supervisor Reference Manual (HP 3000 Computer Systems, MPE V System Operation and Resource Management Reference Manual, if you are using MPE V/E)*.

Configuration is accomplished through an interactive dialogue between you and the computer system. As the questions or prompts appear on your console, enter the appropriate replies through the console keyboard for your desired system configuration.

**NOTE**

In all responses, Y or N can be used for YES or NO. A **RETURN** is equivalent to NO.

Prior to entering the dialogue, log onto the system and input a file reference to a magnetic tape, as follows:

```
:FILE name;DEV=TAPE
:SYSDUMP #name
```

The dialogue commences as follows:

- | STEP NO. | DIALOGUE                                    |
|----------|---|
| 1        | ANY CHANGES? <u>YES</u>                     |
| 2        | SYSTEM ID = HP 32002 v.uu.ff? <b>RETURN</b> |
| 3        | MEMORY SIZE= xxx? <b>RETURN</b>             |
| 4        | I/O CONFIGURATION CHANGES? <u>YES</u>       |
| 5        | LIST I/O DEVICES? <u>YES</u>                |

All I/O devices currently configured on the system are listed with the following column headings:

LOG DEV	Logical device number.
DRT #	Hardware device address (Device Reference Table number) configured on the interface board.
UNIT #	Hardware unit number of device on its controller.
CHAN	Channel number of device on its controller.
TYPE	Device type.
SUBTYPE	Device subtype.
TERM TYPE	Terminal type.
TERM SPEED	Terminal speed.
REC WIDTH	Record width in decimal words.
OUTPUT DEV	Device class name or device ldn.
MODE	J = Accept jobs A = Accept data I = Interactive device D = Duplicative device S = Spooled device
DRIVER NAME	Driver name.
DEVICE CLASSES	Class name assigned to the interface.



<b>NOTE</b>
-------------

The prompt in Step 6, below, appears only if a communications subsystem (CS) device was previously configured into the system.

**STEP NO.      DIALOGUE**

**6                LIST CS DEVICES? YES**

A list of all CS devices currently assigned to the system is printed with the following column headings:

LDN	Logical device number.
PM	Port Mask. (Not used by INP and SSLC)
PRT	Protocol.
LCL MOD	Local mode.
TC	Transmission code.
RCV TMOUT	Receive timeout (in seconds).
CON TMOUT	Connect timeout (in seconds).
MODE	O = Dial out. I = Manual answer. A = Automatic answer. D = Dual speed. H = Half speed. C = Speed changeable.
TRANSMIT SPEED	Transmission speed (characters per second.)
TM	Transmission mode.
BUFFER SIZE	Default buffer capacity, in words.
DC	Driver changeable or not changeable.
DRIVER OPTION	Driver options.

**STEP NO.      DIALOGUE**

If you have a switched device, such as those that are connected through a dial-up telephone line, then you receive the following additional information:

LDN	INP or SSLC logical device number.
CTRL LEN	Not currently implemented.
PHONE NUMBER LIST	A single telephone number -- the default for the data communications line.
LOCAL ID SEQUENCE	The default identification of the local computer.
REMOTE ID SEQUENCE	The default identification of the remote computer.

**7              HIGHEST DRT=xx?**

In the output, xx is a value denoting the present highest DRT entry number that can be assigned to a device.

To change xx, enter the new value desired. If the highest-numbered device in the configuration is a device that uses more than one DRT entry (such as a terminal controller with one or two data set controllers), be sure to enter the highest of the DRT numbers.

To maintain the current xx, enter **RETURN**.

**8              LOGICAL DEVICE #?**

To specify a device to be added or removed, enter the logical device number of that device. An HSI has four ports and thus can be configured up to four times with a unique logical device number for each port. In addition, a communications driver (IODS0) with a unique logical device number must be configured for each HSI port configured.

This prompt is repeated later in the configuration dialogue, so that you can return to this point to configure more than one device.

Entering 0 or **RETURN** will take you to Step 47.

## Configuration Dialog

### STEP NO.      DIALOGUE

9                DRT #?

To add a device, enter its DRT entry number. For a communications driver and a virtual terminal, you must assign the logical device number of the associated communications interface (INP, SSLC, or the HSI port), preceded by a number sign (#).

Virtual terminals need to be configured for only one port of any HSI (back referenced to only one logical device number for the HSI). The terminals will be dynamically allocated to the proper port when a user opens it.

To remove a device and return to Step 8, enter zero.

10              UNIT #? 0

11              SOFTWARE CHANNEL #? 0

12              TYPE?

Enter the device type, where

16 = Virtual Terminals (IODSTRM0 or IODSTRMX)

17 = Intelligent Network Processor (INP)

18 = Synchronous Single-Line Controller (SSLC)

19 = Hardwired Serial Interface (HSI)

41 = Communications Driver (IODS0 or IODSX)

<b>NOTE</b>
-------------

When configuring device type 16, consider the maximum number of terminals supported by your system. Each virtual terminal configured is added to the total number of terminals already on the system. This information is available from your HP Sales Representative.

**STEP NO.      DIALOGUE**

13            SUBTYPE?

**Communications Interface:**

For an INP, enter 0, 1, or 3

For an SSLC, enter 0 or 1

For an HSI, enter 3, where

0 = switched line with modem

1 = nonswitched line with modem or modem eliminator cable

3 = hardwired line, synchronous transmission

**Communications Driver:**

For IODS0 or IODSX, enter 0 or 1, where

0 = no data compression

1 = data compression

**Virtual Terminal:**

For IODSTRM0 or IODSTRMX, always enter 8. 8 is only used for HP 3000 to HP 1000 communications.

**NOTE**

If you are configuring a terminal (type 16), the dialogue continues to Step 14. If you are configuring an HSI (Type 19), the dialogue skips to Step 16. If you are configuring an SSLC (Type 18), the dialogue skips to Step 17. If you are configuring an INP (type 17), the dialogue skips to Step 20. For all other device types, the dialogue skips to Step 34.

14            For MPE V/E:

ENTER [TERM TYPE #], [DESCRIPTOR FILENAME] ?

This question is asked only if the device type is 16, or if it is 32 with a subtype of 14 or 15. Term type is always 0 for DSN/DS Virtual Terminals.

For MPE IV:

TERM TYPE? 0

This question is asked only if Type is 16. Term Type is always zero for DSN/DS Virtual Terminals.

15            SPEED IN CHARACTERS PER SECOND? 0

This question is asked only if device Type is 16, then the dialogue skips to Step 34.

## Configuration Dialog

### STEP NO.      DIALOGUE

#### 16              PORTMASK?

This question is asked only if device Type is 19 (HSI). The values allowable are shown below and must be entered in decimal. This forms a mask indicating which HSI channel will be used. Only one of the four channels may be designated for each unique logical device number.

Enter 8 for HSI cable connector port 0.

Enter 4 for HSI cable connector port 1.

Enter 2 for HSI cable connector port 2.

Enter 1 for HSI cable connector port 3.

Since only one port on the HSI PCA can be opened at a time, only one block of virtual terminals (entered later in this configuration) are needed for that HSI PCA. This same block is automatically reallocated to each new port opened. One block of virtual terminals serves all ports.

#### 17              PROTOCOL? 1

This response defines Binary Synchronous Communications.

#### 18              LOCAL MODE?

DSN/DS/3000 does not use this response. Enter 1.

**STEP NO.      DIALOGUE****19              TRANSMISSION CODE?**

For an HSI, enter 1.

For an SSLC, enter 1, 2, or 3, where

1 = Automatic code sensing of ASCII and EBCDIC if  
initially receiving; ASCII if initially sending;

2 = ASCII transmission.

3 = EBCDIC transmission.

In DSN/DS, all transmissions are ASCII. Only in certain other data communication subsystems can users optionally transfer EBCDIC characters.

**20              RECEIVE TIMEOUT?**

Enter the positive number of seconds the CS device will wait to receive text before terminating the read mode. Entering **RETURN** provides a 20-second timeout.

**NOTE**

For all timeout responses, entering 0 disables the timeout. The maximum timeout is 32000 seconds. DS displays an error when the communications software (CS) disconnects because of a timeout.

**21              LOCAL TIMEOUT?**

Enter the positive number of seconds a connected local station will wait to transmit or receive before disconnecting. Entering **RETURN** provides a 60-second timeout. (Your response is not used for DSN/DS activity.)

**22              CONNECT TIMEOUT?**

Enter the positive number of seconds the local station will wait after one attempt to make a connection to a remote station. Entering **RETURN** provides a 900-second timeout. For an HSI, 100 to 500 is recommended. For an INP or SSLC, 300 is recommended.

**NOTE**

Steps 23 through 25 apply only to CS devices with switched lines connected through a modem (dial telephones, subtype 0). For CS devices with nonswitched lines connected through a modem (private lines, subtype 1), the dialogue skips to Step 26. If the CS device is either an HSI or a hardwired INP (subtype 3), the dialogue skips to Step 28.

## Configuration Dialog

### STEP NO.      DIALOGUE

#### 23              DIAL FACILITY?

Enter YES if manual dial-up is required. Enter the INP LDEV# if the AUTO DIAL feature is used. Enter NO if no dial facility is required.

#### 24              ANSWER FACILITY?

Enter YES if the local modem can answer calls, either manually or automatically. Enter NO if it cannot. A NO response causes the next step to be skipped.

#### 25              AUTOMATIC ANSWER?

Enter YES if the local modem can automatically answer calls. Enter NO if manual answering is required.

#### 26              DUAL SPEED?

Enter YES if the local modem is dual speed (European models). Enter NO if it is single speed. A NO response causes the next step to be skipped.

#### 27              HALF SPEED?

Enter YES if the local modem is to operate at half speed. Enter NO if it is to operate at full speed. The dialogue skips to Step 29.

#### 28              SPEED CHANGEABLE?

For an HSI, enter YES.

For an INP, enter YES if the speed of the line is changeable. Enter NO if the line speed is fixed. In general, the speed is changeable when the communications interface provides the clocking, and it is not changeable when a single-speed modem or other external device provides the clocking. You must respond YES if the console operator will be using the speed parameter in the :DSCONTROL command to override the configured transmission speed (see Step 29).

**STEP NO.      DIALOGUE****29                TRANSMISSION SPEED?**

For INP (Type 17) or SSLC (Type 18) devices, enter the transmission speed of the line in characters per second (Bit Rate/8). For HSI (Type 19) devices, enter 250000 for cable lengths up to 1000 feet, or enter 125000 for cable lengths greater than 1000 feet.

The transmission speed you specify is ignored for modems that provide internal clocking signals. This allows modems of different speeds to be used without reconfiguring the Operating System. The speed specified is used if the modems are eliminated and the controllers are hardwired together.

The speed you specify becomes the default. The console operator can override the default by including the speed parameter in the :DSCONTROL command, if you answered YES to Step 28.



## Configuration Dialog

### STEP NO.      DIALOGUE

#### 30              TRANSMISSION MODE?

Enter the appropriate number for the transmission mode in use. The mode numbers are:

- 0 = Full duplex
- 1 = Half duplex

#### INP and SSLC:

Configure the communications interface (INP or SSLC) to operate in Full Duplex (0) if your facility uses one of the following:

- A leased line with four-wire, point-to-point installation.
- A dial network with two lines (four-wire equivalent).
- A dial network with Wide Band Service.
- Any Direct Connect cable between two INPs.

Configure the communications interface to operate in Half Duplex (1) if your facility uses the following:

- A dial network with a single-line (two-wire) installation.
- An INP-to-SSLC Direct Connect cable (a "modem eliminator" cable between an INP and an SSLC)

Your response must agree with the remote system's configuration and with the characteristics of the communications line.

#### HSI:

Always configure an HSI as Full Duplex (0).

**STEP NO.      DIALOGUE****31            PREFERRED BUFFER SIZE?**

Enter, in words, the desired buffer size, to a maximum of 4095 words for an HSI or SSLC, or up to a maximum of 1024 words for an INP. For a dial-up line, 1024 is generally recommended; for a leased line with an SSLC, the size may be larger than 1024 if the line quality is good. Note that although large buffer sizes increase transmission efficiency, they also use up memory space. Match buffer sizes for sender and receiver whenever possible, since the effective buffer size that can be utilized is the smaller of the two.

**32            DRIVER CHANGEABLE? NO****33            DRIVER OPTIONS? 0**

<b>NOTE</b>
-------------

The dialogue skips to Step 41.

**34            RECORD WIDTH?**

For IODS0 and IODSX, enter 128.

For all Virtual Terminals, enter 40.

**35            OUTPUT DEVICE?**

For the communications drivers, enter 0.

For a virtual terminal, enter the class name or logical device number to be used for the corresponding job/session listing device.

**36            ACCEPT JOBS/SESSIONS?**

For the communications drivers, enter NO.

For virtual terminals, enter YES.

**37            ACCEPT DATA? NO**

## Configuration Dialog

### STEP NO.      DIALOGUE

38            INTERACTIVE?

              For the communications drivers, enter NO.

              For virtual terminals, enter YES.

39            DUPLICATIVE?

              For the communications drivers, enter NO.

              For virtual terminals, enter YES.

40            INITIALLY SPOOLED? NO

41            DRIVER NAME?

              Enter the name of the driver for this device as follows:

              IOINPO    = INP

              CSSBSCO   = SSLC

              CSHBSCO   = HSI

              IODS0     = Communications driver, while using the bisync protocol

              IODSX     = Communications driver, while utilizing the X.25 capability

              IODSTRM0 = Virtual terminals, while using the bisync protocol

              IODSTRMX = Virtual terminals, while utilizing the X.25 capability

<b>NOTE</b>
-------------

Steps 42 through 45 apply to CS devices with switched (dial-up) lines (types 17 and 18, subtype 0). The dialogue for all other devices skips to Step 46.

**STEP NO.      DIALOGUE****42              PHONELIST?**

Enter YES or NO.

You can supply one number (usually a frequently dialed number) which will be the system default.

**43              PHONE NUMBER?**

Enter a string of numbers and hyphens, but not more than 30 characters. This number will be included in the I/O request on the system console when a user OPENS a dial-up line.

The characters that can be used for the phone number are:

0 through 9

/ (separator used for automatic call units that have a second dial tone detect)

E (optional end-of-number indicator)

D (one-second delay. Used for European modems and automatic call units that require built-in delays)

# (defined by the local telephone system)

\* (defined by the local telephone system)

**44              LOCAL ID SEQUENCE?**

The default local ID sequence can be specified in ASCII. Enter **RETURN** for a null local ID sequence, or enter an ASCII string in quotes.

<b>NOTE</b>
-------------

Do not enter more than 16 characters for the local or remote ID sequence.

## Configuration Dialog

### STEP NO.      DIALOGUE

45            REMOTE ID SEQUENCE?

Enter the default remote ID sequence in the same format as the local ID sequence (above). This can be repeated until **(RETURN)** is entered.

46            DEVICE CLASSES?

Enter a list containing a device class name (up to eight alphanumeric characters, beginning with a letter). Class names are separated from each other by commas. These names are left to the discretion of the System Supervisor. They will be used in certain commands and intrinsics when any member of a group of devices (such as any disc drive) can be referenced. No name need be entered.

#### NOTE

For IODSX entries, the destination logical node name cannot be specified as a device class name.

The dialogue now prints the LOGICAL DEVICE #? prompt described in Step 8. If all I/O configuration is complete, press **(RETURN)** and the dialogue continues at Step 47. Otherwise, enter a logical device number and repeat the configuration procedure from Step 8.

47            MAX # OF OPENED SPOOLFILES= xxx? **(RETURN)**

48            LIST OF I/O DEVICES? YES

To print a listing of the new input/output device configuration, enter YES. This list appears in the format described in Step 5.

#### NOTE

Step 49 only appears if you are using MPE V/E.

49            TERMINAL TYPE CHANGES?

Enter NO.

50            LIST CS DEVICES? YES

Enter YES to list the characteristics of the new CS device configuration.

STEP NO.	DIALOGUE
51	CLASS CHANGES? <b>RETURN</b>
52	LIST I/O DEVICES? <b>RETURN</b>

<b>NOTE</b>
-------------

The prompt in Step 53 appears only if a CS device is configured or if additional drivers exist (for the CS driver-changeable option in Step 32). If neither case exists, the dialogue skips to Step 55.

53	ADDITIONAL DRIVER CHANGES? <u>NO</u>
54	I/O CONFIGURATION CHANGES? <u>NO</u>
55	SYSTEM TABLE CHANGES? <u>NO</u>
56	MISC CONFIGURATION CHANGES? <u>NO</u>
57	LOGGING CHANGES? <u>NO</u>
58	DISC ALLOCATION CHANGES? <u>NO</u>
59	SCHEDULING CHANGES? <u>NO</u>
60	SEGMENT LIMIT CHANGES? <u>NO</u>
61	SYSTEM PROGRAM CHANGES? <u>NO</u>
62	SYSTEM SL CHANGES? <u>NO</u>

The NO response assumes CS/3000 modules are already present on the system.

## Configuration Dialog

### STEP NO. DIALOGUE

63 ENTER DUMP DATE?

RETURN Copies the modified MPE. When this copy is used to COLDSTART the system, the account structure and all files remain intact.

mm/dd/yy where mm/dd/yy is some date in the future. Copies the modified MPE and the current accounting, but no files.

mm/dd/yy where mm/dd/yy is usually the date of the most recent system backup. Copies the modified MPE, the current accounting structure, and any files that were changed on or since the specified date.

0 Copies the entire system (MPE, the current accounting structure, and all files).

64 ENTER DUMP FILE SUBSETS?

Enter RETURN, or enter a filename or series of filenames. (Example: @.PUB.SYS)

65 LIST FILES DUMPED? YES or NO

66 The console operator must now use the =REPLY command to assign the magnetic tape drive on which you have arranged for a tape reel to be mounted.

After the SYSDUMP is complete, the tape produced should be used to COLDSTART the system. During COLDSTART, the old I/O device configuration is replaced with the new one from your SYSDUMP tape.

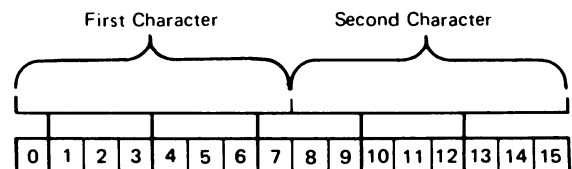
# HP ASCII CHARACTER SET

APPENDIX

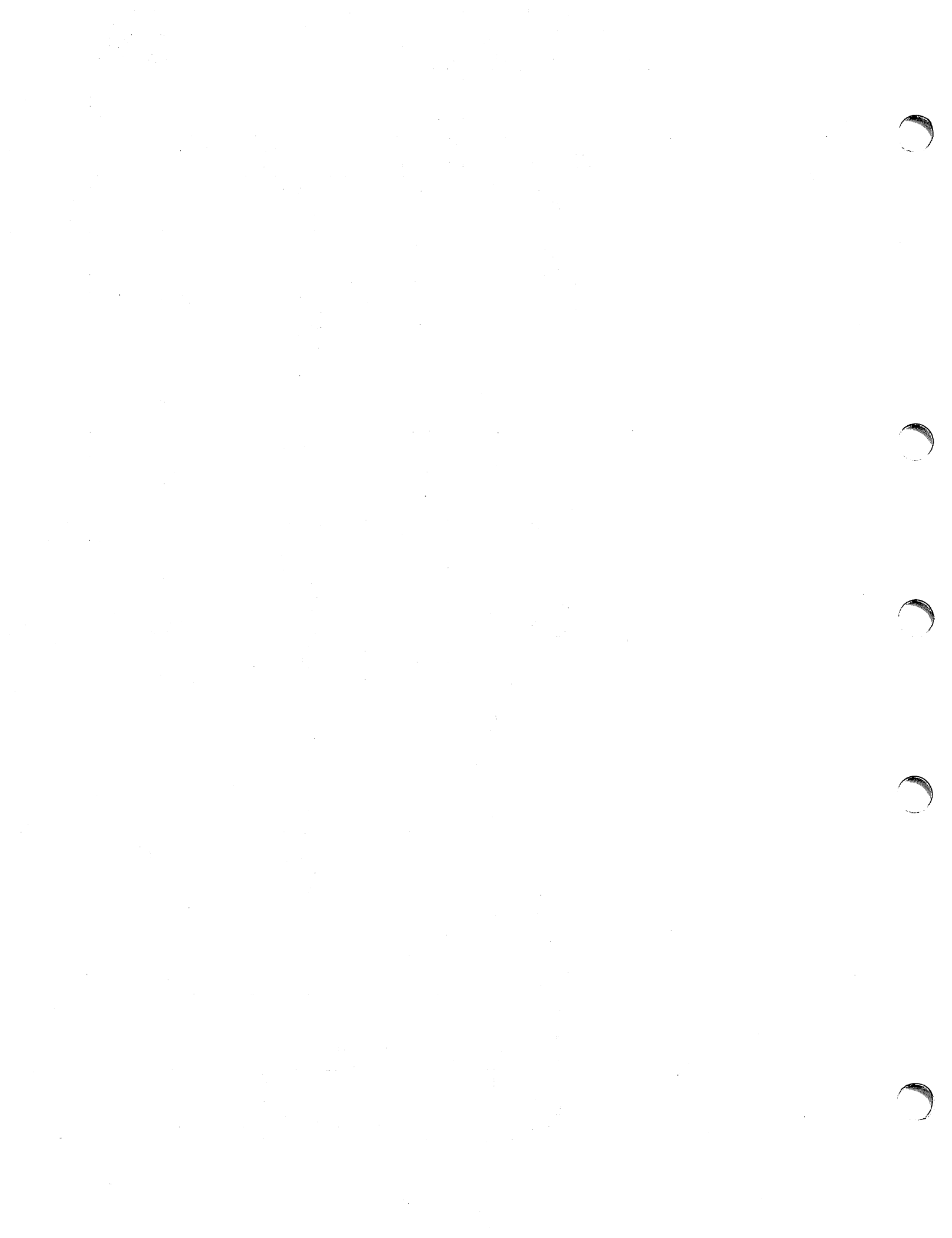
F

ASCII Character	First Character Octal Equivalent	Second Character Octal Equivalent
A	040400	000101
B	041000	000102
C	041400	000103
D	042000	000104
E	042400	000105
F	043000	000106
G	043400	000107
H	044000	000110
I	044400	000111
J	045000	000112
K	045400	000113
L	046000	000114
M	046400	000115
N	047000	000116
O	047400	000117
P	050000	000120
Q	050400	000121
R	051000	000122
S	051400	000123
T	052000	000124
U	052400	000125
V	053000	000126
W	053400	000127
X	054000	000130
Y	054400	000131
Z	055000	000132
a	060400	000141
b	061000	000142
c	061400	000143
d	062000	000144
e	062400	000145
f	063000	000146
g	063400	000147
h	064000	000150
i	064400	000151
j	065000	000152
k	065400	000153
l	066000	000154
m	066400	000155
n	067000	000156
o	067400	000157
p	070000	000160
q	070400	000161
r	071000	000162
s	071400	000163
t	072000	000164
u	072400	000165
v	073000	000166
w	073400	000167
x	074000	000170
y	074400	000171
z	075000	000172
0	030000	000060
1	030400	000061
2	031000	000062
3	031400	000063
4	032000	000064
5	032400	000065
6	033000	000066
7	033400	000067
8	034000	000070
9	034400	000071
NUL	000000	000000
SOH	000400	000001
STX	001000	000002
ETX	001400	000003
EOT	002000	000004
ENQ	002400	000005

ASCII Character	First Character Octal Equivalent	Second Character Octal Equivalent
ACK	003000	000006
BEL	003400	000007
BS	004000	000010
HT	004400	000011
LF	005000	000012
VT	005400	000013
FF	006000	000014
CR	006400	000015
SO	007000	000016
SI	007400	000017
DLE	010000	000020
DC1	010400	000021
DC2	011000	000022
DC3	011400	000023
DC4	012000	000024
NAK	012400	000025
SYN	013000	000026
ETB	013400	000027
CAN	014000	000030
EM	014400	000031
SUB	015000	000032
ESC	015400	000033
FS	016000	000034
GS	016400	000035
RS	017000	000036
US	017400	000037
SPACE	020000	000040
!	020400	000041
"	021000	000042
#	021400	000043
\$	022000	000044
%	022400	000045
&	023000	000046
'	023400	000047
(	024000	000050
)	024400	000051
*	025000	000052
+	025400	000053
,	026000	000054
-	026400	000055
.	027000	000056
/	027400	000057
:	035000	000072
;	035400	000073
<	036000	000074
=	036400	000075
>	037000	000076
?	037400	000077
@	040000	000100
[	055400	000133
\	056000	000134
]	056400	000135
^	057000	000136
_	057400	000137
`	060000	000140
{	075400	000173
	076000	000174
}	076400	000175
~	077000	000176
DEL	077400	000177







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# READER COMMENT SHEET

Distributed Systems Network

DSN/DS HP 3000 TO HP 1000  
Reference Manual for HP 3000 Users

32189-90005 February 1984

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### Key Product Line

- A Analytical
- CM Components
- C Computer Systems Sales only
- CH Computer Systems Hardware Sales and Services
- CS Computer Systems Software Sales and Services
- E Electronic Instruments & Measurement Systems
- M Medical Products
- MP Medical Products Primary SRO
- MS Medical Products Secondary SRO
- P Personal Computation Products
- \* Sales only for specific product line
- \*\* Support only for specific product line

**IMPORTANT:** These symbols designate general product line capability. They do not insure sales or support availability for all products within a line, at all locations. Contact your local sales office for information regarding locations where HP support is available for specific products.

*HP distributors are printed in italics.*

## HEADQUARTERS OFFICES

If there is no sales office listed for your area, contact one of these headquarters offices.

### NORTH/CENTRAL AFRICA

Hewlett-Packard S.A.  
7, Rue du Bois-du-Lan  
CH-1217 MEYRIN 2, Switzerland  
Tel: (022) 83 12 12  
Telex: 27835 hpse  
Cable: HEWPACKSA Geneve

### ASIA

Hewlett-Packard Asia Ltd.  
6th Floor, Sun Hung Kai Centre  
30 Harbour Rd.  
G.P.O. Box 795

### HONG KONG

Tel: 5-832 3211  
*After Jan. 1, 1984*  
47th Floor, China Resources Bldg.  
26 Harbour Rd., Wanchai

### HONG KONG

Telex: 66678 HEWPA HX  
Cable: HEWPACK HONG KONG

### CANADA

Hewlett-Packard (Canada) Ltd.  
6877 Goreway Drive  
MISSISSAUGA, Ontario L4V 1M8  
Tel: (416) 678-9430  
Telex: 610-492-4246

### EASTERN EUROPE

Hewlett-Packard Ges.m.b.h.  
Liebigasse 1  
P.O.Box 72  
A-1222 VIENNA, Austria  
Tel: (222) 2365110  
Telex: 1 3 4425 HEPA A

### NORTHERN EUROPE

Hewlett-Packard S.A.  
Uilenstede 475  
P.O.Box 999  
NL-1180 AZ AMSTELVEEN  
The Netherlands  
Tel: 20 437771

### SOUTH EAST EUROPE

Hewlett-Packard S.A.  
7, Rue du Bois-du-Lan  
CH-1217 MEYRIN 2, Switzerland  
Tel: (022) 83 12 12  
Telex: 27835 hpse  
Cable: HEWPACKSA Geneve

### OTHER EUROPE

Hewlett-Packard S.A.  
P.O. Box  
150, Rte du Nant-D'Avril  
CH-1217 MEYRIN 2, Switzerland  
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Telex: 22486 hpsa  
Cable: HEWPACKSA Geneve

### MEDITERRANEAN AND MIDDLE EAST

Hewlett-Packard S.A.  
Mediterranean and Middle East  
Operations  
Atrina Centre  
32 Kifissias Ave.  
Paradissos-Amarousion, ATHENS  
Greece  
Tel: 682 88 11  
Telex: 21-6588 HPAT GR  
Cable: HEWPACKSA Athens

### EASTERN USA

Hewlett-Packard Co.  
4 Choke Cherry Road  
ROCKVILLE, MD 20850  
Tel: (301) 258-2000

### MIDWESTERN USA

Hewlett-Packard Co.  
5201 Tollview Drive  
ROLLING MEADOWS, IL 60008  
Tel: (312) 255-9800

### SOUTHERN USA

Hewlett-Packard Co.  
2000 South Park Place  
P.O. Box 105005  
ATLANTA, GA 30348  
Tel: (404) 955-1500

### WESTERN USA

Hewlett-Packard Co.  
3939 Lankershim Blvd.  
P.O. Box 3919  
LOS ANGELES, CA 91604  
Tel: (213) 506-3700

### OTHER INTERNATIONAL AREAS

Hewlett-Packard Co.  
Intercontinental Headquarters  
3495 Deer Creek Road  
PALO ALTO, CA 94304  
Tel: (415) 857-1501  
Telex: 034-8300  
Cable: HEWPACK

### ANGOLA

*Telectra*  
Empresa Técnica de Equipamentos  
R. Barbosa Rodrigues, 41-I DT.  
Caixa Postal 6487  
LUANDA  
Tel: 35515,35516  
E,P

### ARGENTINA

Hewlett-Packard Argentina S.A.  
Avenida Santa Fe 2035  
Martinez 1640 BUENOS AIRES  
Tel: 798-5735, 792-1293  
Telex: 17595 BIONAR  
Cable: HEWPACKARG  
A,E,CH,CS,P  
*Bioltron S.A.C.I.M. e I.*  
Av Paseo Colon 221, Piso 9  
1399 BUENOS AIRES  
Tel: 30-4846, 30-1851  
Telex: 17595 BIONAR  
M

### AUSTRALIA

#### Adelaide, South Australia Office

Hewlett-Packard Australia Ltd.  
153 Greenhill Road  
PARKSIDE, S.A. 5063  
Tel: 272-5911  
Telex: 82536  
Cable: HEWPARAD Adelaide  
A\*,CH,CM,,E,MS,P

#### Brisbane, Queensland Office

Hewlett-Packard Australia Ltd.  
10 Payne Road  
THE GAP, Queensland 4061  
Tel: 30-4133  
Telex: 42133  
Cable: HEWPARAD Brisbane  
A,CH,CM,E,M,P

#### Canberra, Australia Capital Territory Office

Hewlett-Packard Australia Ltd.  
121 Wollongong Street  
FYSHWICK, A.C.T. 2609  
Tel: 80 4244  
Telex: 62650  
Cable: HEWPARAD Canberra  
CH,CM,E,P

#### Melbourne, Victoria Office

Hewlett-Packard Australia Ltd.  
31-41 Joseph Street  
BLACKBURN, Victoria 3130  
Tel: 895-2895  
Telex: 31-024  
Cable: HEWPARAD Melbourne  
A,CH,CM,CS,E,MS,P

#### Perth, Western Australia Office

Hewlett-Packard Australia Ltd.  
261 Stirling Highway  
CLAREMONT, W.A. 6010  
Tel: 383-2188  
Telex: 93859  
Cable: HEWPARAD Perth  
A,CH,CM,E,MS,P

### Sydney, New South Wales Office

Hewlett-Packard Australia Ltd.  
17-23 Talavera Road  
P.O. Box 308  
NORTH RYDE, N.S.W. 2113  
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Telex: 21561  
Cable: HEWPARAD Sydney  
A,CH,CM,CS,E,MS,P

### AUSTRIA

Hewlett-Packard Ges.m.b.h.  
Grottenhofstrasse 94  
A-8052 GRAZ  
Tel: (0316) 291 5 66  
Telex: 32375  
CH,E  
Hewlett-Packard Ges.m.b.h.  
Liebigasse 1  
P.O. Box 72  
A-1222 VIENNA  
Tel: (0222) 23 65 11-0  
Telex: 134425 HEPA A  
A,CH,CM,CS,E,MS,P

### BAHRAIN

*Green Salon*  
P.O. Box 557  
Manama  
BAHRAIN  
Tel: 255503-255950  
Telex: 844 19  
P

*Wael Pharmacy*  
P.O. Box 648

### BAHRAIN

Tel: 256123  
Telex: 8550 WAEL BN  
E,C,M

### BELGIUM

Hewlett-Packard Belgium S.A./N.V.  
Blvd de la Woluwe, 100  
Woluwedal  
B-1200 BRUSSELS  
Tel: (02) 762-32-00  
Telex: 23-494 paloben bru  
A,CH,CM,CS,E,MP,P

### BRAZIL

Hewlett-Packard do Brasil I.e.C. Ltda.  
Alameda Rio Negro, 750  
Alphaville  
06400 BARUERI SP  
Tel: (011) 421.1311  
Telex: (011) 33872 HPBR-BR  
Cable: HEWPACK Sao Paulo  
A,CH,CM,CS,E,M,P  
Hewlett-Packard do Brasil I.e.C. Ltda.  
Avenida Epitacio Pessoa, 4664  
22471 RIO DE JANEIRO-RJ  
Tel: (021) 286.0237  
Telex: 021-21905 HPBR-BR  
Cable: HEWPACK Rio de Janeiro  
A,CH,CM,E,MS,P\*  
*ANAMED I.C.E.I. Ltda.*  
Rua Bage, 103  
04012 SAO PAULO  
Tel: (011) 570-5726  
Telex: 021-21905 HPBR-BR  
M





# SALES & SUPPORT OFFICES

Arranged alphabetically by country

## CANADA

### Alberta

Hewlett-Packard (Canada) Ltd.  
3030 3rd Avenue N.E.  
CALGARY, Alberta T2A 6T7  
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A,CH,CM,E\*,MS,P\*

Hewlett-Packard (Canada) Ltd.  
11120A-178th Street  
EDMONTON, Alberta T5S 1P2  
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A,CH,CM,CS,E,MS,P

### British Columbia

Hewlett-Packard (Canada) Ltd.  
10691 Shellbridge Way  
RICHMOND,  
British Columbia V6X 2W7  
Tel: (604) 270-2277  
Telex: 610-922-5059  
A,CH,CM,CS,E\*,MS,P\*

### Manitoba

Hewlett-Packard (Canada) Ltd.  
380-550 Century Street  
WINNIPEG, Manitoba R3H 0Y1  
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### Nova Scotia

Hewlett-Packard (Canada) Ltd.  
P.O. Box 931  
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DARTMOUTH, Nova Scotia B2Y 3Z6  
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### Ontario

Hewlett-Packard (Canada) Ltd.  
3325 N. Service Rd., Unit 6  
BURLINGTON, Ontario P3A 2A3  
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CS,M\*

Hewlett-Packard (Canada) Ltd.  
552 Newbold Street  
LONDON, Ontario N6E 2S5  
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Hewlett-Packard (Canada) Ltd.  
6877 Goreway Drive  
MISSISSAUGA, Ontario L4V 1M8  
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Hewlett-Packard (Canada) Ltd.  
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Hewlett-Packard (Canada) Ltd.  
220 Yorkland Blvd., Unit #11  
WILLOWDALE, Ontario M2J 1R5  
Tel: (416) 499-9333  
CH

### Quebec

Hewlett-Packard (Canada) Ltd.  
17500 South Service Road  
Trans-Canada Highway  
KIRKLAND, Quebec H9J 2M5  
Tel: (514) 697-4232  
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Hewlett-Packard (Canada) Ltd.  
Les Galeries du Vallon  
2323 Du Versant Nord  
STE. FOY, Quebec G1N 4C2  
Tel: (418) 687-4570  
CH

## CHILE

Jorge Calcagni y Cia. Ltda.  
Av. Italia 634 Santiago  
Casilla 16475  
SANTIAGO 9  
Tel: 222-0222  
Telex: Public Booth 440001  
A,CM,E,M

Olympia (Chile) Ltda.  
Av. Rodrigo de Araya 1045  
Casilla 256-V  
SANTIAGO 21  
Tel: (02) 22 55 044  
Telex: 240-565 OLYMP CL  
Cable: Olympiachile Santiagochile  
CH,CS,P

## CHINA, People's Republic of

China Hewlett-Packard Rep. Office  
P.O. Box 418  
1A Lane 2, Luchang St.  
Beiwei Rd., Xuanwu District  
BEIJING  
Tel: 33-1947, 33-7426  
Telex: 22601 CTSHP CN  
Cable: 1920  
A,CH,CM,CS,E,P

## COLOMBIA

Instrumentación  
H. A. Langebaek & Kier S.A.  
Carrera 4A No. 52A-26  
Apartado Aereo 6287  
BOGOTA 1, D.E.  
Tel: 212-1466  
Telex: 44400 INST CO  
Cable: AARIS Bogota  
CM,E,M  
Casa Humboldt Ltda.  
Carrera 14, No. 98-60  
Apartado Aereo 51283  
BOGOTA 1, D.E.  
Tel: 256-1686  
Telex: 45403 CCAL CO.  
A

## COSTA RICA

Científica Costarricense S.A.  
Avenida 2, Calle 5  
San Pedro de Montes de Oca  
Apartado 10159  
SAN JOSE  
Tel: 24-38-20, 24-08-19  
Telex: 2367 GALGUR CR  
CM,E,M

## CYPRUS

Telexa Ltd.  
P.O. Box 4809  
14C Stassinou Avenue  
NICOSIA  
Tel: 62698  
Telex: 2894 LEVIDO CY  
E,M,P

## DENMARK

Hewlett-Packard A/S  
Datavej 52  
DK-3460 BIRKEROD  
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Hewlett-Packard A/S  
Rølighedsvej 32  
DK-8240 RISSKOV, Aarhus  
Tel: (06) 17-60-00  
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CH,E

## DOMINICAN REPUBLIC

Microprog S.A.  
Juan Tomás Mejía y Cotes No. 60  
Arroyo Hondo  
SANTO DOMINGO  
Tel: 565-6268  
Telex: 4510 ARENTA DR (RCA) P

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CYEDE Cia. Ltda.  
Avenida Eloy Alfaro 1749  
Casilla 6423 CCI  
QUITO  
Tel: 450-975, 243-052  
Telex: 2548 CYEDE ED  
CM,E,P

### Hospitalar S.A.

Robles 625  
Casilla 3590  
QUITO  
Tel: 545-250, 545-122  
Telex: 2485 HOSPTL ED  
Cable: HOSPITALAR-Quito  
M

## EGYPT

International Engineering Associates  
24 Hussein Hegazi Street  
Kasr-el-Aini  
CAIRO  
Tel: 23829, 21641  
Telex: IEA UN 93830  
CH,CS,E,M  
EGYPOR  
P.O.Box 2558  
42 El Zahraa Street  
CAIRO, Egypt  
Tel: 65 00 21  
Telex: 93 337  
P

## EL SALVADOR

IPESA de El Salvador S.A.  
29 Avenida Norte 1216  
SAN SALVADOR  
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Telex: 20539 IPESASAL  
A,CH,CM,CS,E,P

## FINLAND

Hewlett-Packard Oy  
Revontulentie 7  
PL 24  
SF-02101 ESPOO 10  
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Telex: 121563 hewpa sf  
CH,CM,CS,P  
Hewlett-Packard Oy  
(Olarinluoma 7)  
PL 24  
02101 ESPOO 10  
Tel: (90) 4521022  
A,E,MS  
Hewlett-Packard Oy  
Aatoksenkatu 10-C  
SF-40720-72 JYVASKYLA  
Tel: (941) 216318  
CH  
Hewlett-Packard Oy  
Kainuntie 1-C  
SF-90140-14 OULU  
Tel: (981) 338785  
CH

## FRANCE

Hewlett-Packard France  
Z.I. Mercure B  
Rue Berthelot  
F-13763 Les Milles Cedex  
AIX-EN-PROVENCE  
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Telex: 410770F  
A,CH,E,MS,P\*

Hewlett-Packard France  
64, rue Marchand Saillant  
F-61000 ALENCON  
Tel: 16 (33) 29 04 42

Hewlett-Packard France  
Boite Postale 503  
F-25026 BESANCON  
28 rue de la Republique  
F-25000 BESANCON  
Tel: 16 (81) 83-16-22  
CH,M

Hewlett-Packard France  
13, Place Napoleon III  
F-29000 BREST  
Tel: 16 (98) 03-38-35

Hewlett-Packard France  
Chemin des Mouilles  
Boite Postale 162  
F-69130 ECULLY Cedex (Lyon)  
Tel: 16 (78) 833-81-25  
Telex: 310617F  
A,CH,CS,E,MP

Hewlett-Packard France  
Tour Lorraine  
Boulevard de France  
F-91035 EVRY Cedex  
Tel: 16 6 077-96-60  
Telex: 692315F  
E

Hewlett-Packard France  
Parc d'Activite du Bois Briard  
Ave. du Lac  
F-91040 EVRY Cedex  
Tel: 16 6 077-8383  
Telex: 692315F  
E

Hewlett-Packard France  
5, avenue Raymond Chanas  
F-38320 EYBENS (Grenoble)  
Tel: 16 (76) 25-81-41  
Telex: 980124 HP GRENBO EYBE  
CH

Hewlett-Packard France  
Centre d'Affaire Paris-Nord  
Bâtiment Ampère 5 étage  
Rue de la Commune de Paris  
Boite Postale 300  
F-93153 LE BLANC MESNIL  
Tel: 16 (1) 865-44-52  
Telex: 211032F  
CH,CS,E,MS

Hewlett-Packard France  
Parc d'Activités Cadera  
Quartier Jean Mermoz  
Avenue du Président JF Kennedy  
F-33700 MERIGNAC (Bordeaux)  
Tel: 16 (56) 34-00-84  
Telex: 550105F  
CH,E,MS

Hewlett-Packard France  
Immueble "Les 3 B"  
Nouveau Chemin de la Garde  
ZAC de Bois Briard  
F-44085 NANTES Cedex  
Tel: 16 (40) 50-32-22  
CH\*\*



## FRANCE (Cont'd)

Hewlett-Packard France  
125, rue du Faubourg Bannier  
F-45000 ORLEANS  
Tel: 16 (38) 68 01 63

Hewlett-Packard France  
Zone Industrielle de Courtaboeuf  
Avenue des Tropiques  
F-91947 Les Ulis Cedex **ORSAY**  
Tel: (6) 907-78-25  
Telex: 600048F  
A,CH,CM,CS,E,MP,P

Hewlett-Packard France  
Paris Porte-Maillot  
15, Avenue de L'Amiral Bruix  
F-75782 PARIS CEDEX 16  
Tel: 16 (1) 502-12-20  
Telex: 613663F  
CH,MS,P

Hewlett-Packard France  
124, Boulevard Tourasse  
F-64000 PAU  
Tel: 16 (59) 80 38 02

Hewlett-Packard France  
2 Allée de la Bourgonnette  
F-35100 RENNES  
Tel: 16 (99) 51-42-44  
Telex: 740912F  
CH,CM,E,MS,P\*

Hewlett-Packard France  
98 Avenue de Bretagne  
F-76100 ROUEN  
Tel: 16 (35) 63-57-66  
CH\*\* ,CS

Hewlett-Packard France  
4 Rue Thomas Mann  
Boite Postale 56  
F-67033 STRASBOURG Cedex  
Tel: 16 (88) 28-56-46  
Telex: 890141F  
CH,E,MS,P\*

Hewlett-Packard France  
Le Péripole  
20, Chemin du Pigeonnier de la Céprière  
F-31083 TOULOUSE Cedex  
Tel: 16 (61) 40-11-12  
Telex: 531639F  
A,CH,CS,E,P\*

Hewlett-Packard France  
9, rue Baudin  
F-26000 VALENCE  
Tel: 16 (75) 42 76 16

Hewlett-Packard France  
Carolor  
ZAC de Bois Briand  
F-57640 VIGY (Metz)  
Tel: 16 (8) 771 20 22  
CH

Hewlett-Packard France  
Immeuble Péricentre  
F-59658 VILLENEUVE D'ASCQ Cedex  
Tel: 16 (20) 91-41-25  
Telex: 160124F  
CH,E,MS,P\*

**GERMAN FEDERAL REPUBLIC**  
Hewlett-Packard GmbH  
Geschäftsstelle  
Keithstrasse 2-4  
D-1000 BERLIN 30  
Tel: (030) 24-90-86  
Telex: 018 3405 hpbln d  
A,CH,E,M,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Herrenberger Strasse 130  
D-7030 BOBLINGEN  
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Telex:  
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Hewlett-Packard GmbH  
Geschäftsstelle  
Emanuel-Leutze-Strasse 1  
D-4000 DUSSELDORF  
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Telex: 085/86 533 hpdd d  
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Hewlett-Packard GmbH  
Geschäftsstelle  
Schleefstr. 28a  
D-4600 DORTMUND-Aplerbeck  
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Hewlett-Packard GmbH  
Vertriebszentrale Frankfurt  
Berner Strasse 117  
Postfach 560 140  
D-6000 FRANKFURT 56  
Tel: (0611) 50-04-1  
Telex: 04 13249 hpffm d  
A,CH,CM,CS,E,MP,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Aussenstelle Bad Homburg  
Louisenstrasse 115  
D-6380 BAD HOMBURG  
Tel: (06172) 109-0

Hewlett-Packard GmbH  
Geschäftsstelle  
Kapstadtring 5  
D-2000 HAMBURG 60  
Tel: (040) 63804-1  
Telex: 021 63 032 hphd d  
A,CH,CS,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Heidering 37-39  
D-3000 HANNOVER 61  
Tel: (0511) 5706-0  
Telex: 092 3259  
A,CH,CM,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Rosslauer Weg 2-4  
D-6800 MANNHEIM  
Tel: (0621) 70050  
Telex: 0462105  
A,C,E

Hewlett-Packard GmbH  
Geschäftsstelle  
Messerschmittstrasse 7  
D-7910 NEU ULM  
Tel: 0731-70241  
Telex: 0712816 HP ULM-D  
A,C,E\*

Hewlett-Packard GmbH  
Geschäftsstelle  
Ehhericherstr. 13  
D-8500 NÜRNBERG 10  
Tel: (0911) 5205-0  
Telex: 0623 860  
CH,CM,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Eschenstrasse 5  
D-8028 TAUFKIRCHEN  
Tel: (089) 6117-1  
Telex: 0524985  
A,CH,CM,E,MS,P

## GREAT BRITAIN

See United Kingdom

## GREECE

Kostas Karayannis S.A.  
8 Omirou Street  
ATHENS 133  
Tel: 32 30 303, 32 37 371  
Telex: 215962 RKAR GR  
A,CH,CM,CS,E,M,P

PLAISIO S.A.  
G. Gerardos  
24 Stourmara Street  
ATHENS  
Tel: 36-11-160  
Telex: 221871  
P

## GUATEMALA

IPESA  
Avenida Reforma 3-48, Zona 9  
GUATEMALA CITY  
Tel: 316627, 314786  
Telex: 4192 TELTRO GU  
A,CH,CM,CS,E,M,P

## HONG KONG

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30 Harbour Road  
HONG KONG  
Tel: 5-8323211  
Telex: 66678 HEWPA HX  
Cable: HEWPACK HONG KONG  
E,CH,CS,P

## CET Ltd.

1402 Tung Wah Mansion  
199-203 Hennessy Rd.  
Wanchia, HONG KONG  
Tel: 5-729376  
Telex: 85148 CET HX  
CM  
Schmidt & Co. (Hong Kong) Ltd.  
Wing On Centre, 28th Floor  
Connaught Road, C.  
HONG KONG  
Tel: 5-455644  
Telex: 74766 SCHMX HX  
A,M

## ICELAND

Elding Trading Company Inc.  
Hafnarnvöll-Tryggvagötu  
P.O. Box 895  
IS-REYKJAVIK  
Tel: 1-58-20, 1-63-03  
M

## INDIA

Computer products are sold through Blue Star Ltd. All computer repairs and maintenance service is done through Computer Maintenance Corp.

Blue Star Ltd.  
Sabri Complex II Floor  
24 Residency Rd.  
BANGALORE 560 025  
Tel: 55660  
Telex: 0845-430  
Cable: BLUESTAR  
A,CH\*,CM,CS\*,E

Blue Star Ltd.  
Band Box House  
Prabhadevi  
BOMBAY 400 025  
Tel: 422-3101  
Telex: 011-3751  
Cable: BLUESTAR  
A,M

Blue Star Ltd.  
Sahas  
414/2 Vir Savarkar Marg  
Prabhadevi  
BOMBAY 400 025  
Tel: 422-6155  
Telex: 011-4093  
Cable: FROSTBLUE  
A,CH\*,CM,CS\*,E,M

Blue Star Ltd.  
Kalyan, 19 Vishwas Colony  
Alkapuri, BORODA, 390 005  
Tel: 65235  
Cable: BLUE STAR  
A

Blue Star Ltd.  
7 Hare Street  
CALCUTTA 700 001  
Tel: 12-01-31  
Telex: 021-7655  
Cable: BLUESTAR  
A,M

Blue Star Ltd.  
133 Kodambakkam High Road  
MADRAS 600 034  
Tel: 82057  
Telex: 041-379  
Cable: BLUESTAR  
A,M

Blue Star Ltd.  
Bhandari House, 7th/8th Floors  
91 Nehru Place  
NEW DELHI 110 024  
Tel: 682547  
Telex: 031-2463  
Cable: BLUESTAR  
A,CH\*,CM,CS\*,E,M

Blue Star Ltd.  
15/16-C Wellesley Rd.  
PUNE 411 011  
Tel: 22775  
Cable: BLUE STAR  
A

Blue Star Ltd.  
2-2-47/1108 Bolarum Rd.  
SECUNDERABAD 500 003  
Tel: 72057  
Telex: 0155-459  
Cable: BLUEFROST  
A,E

Blue Star Ltd.  
T.C. 7/603 Poornima  
Maruthankuzhi  
TRIVANDRUM 695 013  
Tel: 65799  
Telex: 0884-259  
Cable: BLUESTAR  
E

Computer Maintenance Corporation Ltd.  
115, Sarojini Devi Road  
SECUNDERABAD 500 003  
Tel: 310-184, 345-774  
Telex: 031-2960  
CH\*\*



# SALES & SUPPORT OFFICES

Arranged alphabetically by country

## INDONESIA

**BERCA Indonesia P.T.**  
P.O.Box 496/Jkt.  
Jl. Abdul Muis 62  
**JAKARTA**  
Tel: 21-373009  
Telex: 46748 BERSAL IA  
Cable: BERSAL JAKARTA  
P

**BERCA Indonesia P.T.**  
P.O.Box 2497/Jkt  
Antara Bldg., 17th Floor  
Jl. Medan Merdeka Selatan 17  
**JAKARTA-PUSAT**  
Tel: 21-344-181  
Telex: BERSAL IA  
A,CS,E,M

**BERCA Indonesia P.T.**  
P.O. Box 174/SBY.  
Jl. Kutei No. 11  
**SURABAYA**  
Tel: 68172  
Telex: 31146 BERSAL SB  
Cable: BERSAL-SURABAYA  
A\*,E,M,P

## IRAQ

Hewlett-Packard Trading S.A.  
Service Operation  
Al Mansoor City 9B/3/7  
**BAGHDAD**  
Tel: 551-49-73  
Telex: 212-455 HEPAIRAQ IK  
CH,CS

## IRELAND

Hewlett-Packard Ireland Ltd.  
82/83 Lower Leeson Street  
**DUBLIN 2**  
Tel: 0001 608800  
Telex: 30439  
A,CH,CM,CS,E,M,P  
*Cardiac Services Ltd.*  
*Kilmore Road*  
*Artane*  
**DUBLIN 5**  
Tel: (01) 351820  
Telex: 30439  
M

## ISRAEL

*Eldan Electronic Instrument Ltd.*  
P.O.Box 1270  
**JERUSALEM 91000**  
16, Ohaliav St.  
**JERUSALEM 94467**  
Tel: 533 221, 553 242  
Telex: 25231 AB/PAKRD IL  
A

*Electronics Engineering Division*  
*Motorola Israel Ltd.*  
16 Kremenetski Street  
P.O. Box 25016  
**TEL-AVIV 67899**  
Tel: 3 88 388  
Telex: 33569 Motil IL  
Cable: BASTEL Tel-Aviv  
CH,CM,CS,E,M,P

## ITALY

Hewlett-Packard Italiana S.p.A  
Traversa 99C  
Via Giulio Petroni, 19  
I-70124 **BARI**  
Tel: (080) 41-07-44  
M

Hewlett-Packard Italiana S.p.A.  
Via Martin Luther King, 38/III  
I-40132 **BOLOGNA**  
Tel: (051) 402394  
Telex: 511630  
CH,E,MS

Hewlett-Packard Italiana S.p.A.  
Via Principe Nicola 43G/C  
I-95126 **CATANIA**  
Tel: (095) 37-10-87  
Telex: 970291  
C,P

Hewlett-Packard Italiana S.p.A.  
Via G. Di Vittorio 9  
I-20063 **CERNUSCO SUL NAVIGLIO**  
(Milano)  
Tel: (02) 923691  
Telex: 334632  
A,CH,CM,CS,E,MP,P

Hewlett-Packard Italiana S.p.A.  
Via C. Colombo 49  
I-20090 **TREZZANO SUL NAVIGLIO**  
(Milano)  
Tel: (02) 4459041  
Telex: 322116  
C,M

Hewlett-Packard Italiana S.p.A.  
Via Nuova San Rocco a  
Capodimonte, 62/A  
I-80131 **NAPOLI**  
Tel: (081) 7413544  
Telex: 710698  
A,CH,E

Hewlett-Packard Italiana S.p.A.  
Viale G. Modugno 33  
I-16156 **GENOVA PEGLI**  
Tel: (010) 68-37-07  
Telex: 215238  
E,C

Hewlett-Packard Italiana S.p.A.  
Via Pelizzo 15  
I-35128 **PADOVA**  
Tel: (049) 664888  
Telex: 430315  
A,CH,E,MS

Hewlett-Packard Italiana S.p.A.  
Viale C. Pavese 340  
I-00144 **ROMA EUR**  
Tel: (06) 54831  
Telex: 610514  
A,CH,CM,CS,E,MS,P\*

Hewlett-Packard Italiana S.p.A.  
Via di Casellina 57/C  
I-50018 **SCANDICCI-FIRENZE**  
Tel: (055) 753863

Hewlett-Packard Italiana S.p.A.  
Corso Svizzera, 185  
I-10144 **TORINO**  
Tel: (011) 74 4044  
Telex: 221079  
CH,E

## JAPAN

Yokogawa-Hewlett-Packard Ltd.  
152-1, Onna  
**ATSUGI**, Kanagawa, 243  
Tel: (0462) 28-0451  
CM,C\*,E

Yokogawa-Hewlett-Packard Ltd.  
Meiji-Seimei Bldg. 6F  
3-1 Hon Chiba-Cho  
**CHIBA**, 280  
Tel: 472 25 7701  
E,CH,CS

Yokogawa-Hewlett-Packard Ltd.  
Yasuda-Seimei Hiroshima Bldg.  
6-11, Hon-dori, Naka-ku  
**HIROSHIMA**, 730  
Tel: 82-241-0611

Yokogawa-Hewlett-Packard Ltd.  
Towa Building  
2-3, Kaigan-dori, 2 Chome Chuo-ku  
**KOBE**, 650  
Tel: (078) 392-4791  
C,E

Yokogawa-Hewlett-Packard Ltd.  
Kumagaya Asahi 82 Bldg  
3-4 Tsukuba  
**KUMAGAYA**, Saitama 360  
Tel: (0485) 24-6563  
CH,CM,E

Yokogawa-Hewlett-Packard Ltd.  
Asahi Shinbun Daiichi Seimei Bldg.  
4-7, Hanabata-cho  
**KUMAMOTO,860**  
Tel: (0963) 54-7311  
CH,E

Yokogawa-Hewlett-Packard Ltd.  
Shin-Kyoto Center Bldg.  
614, Higashi-Shiokoji-cho  
Karasuma-Nishiiru  
Shiokoji-dori, Shimogyo-ku  
**KYOTO**, 600  
Tel: 075-343-0921  
CH,E

Yokogawa-Hewlett-Packard Ltd.  
Mito Mitsui Bldg  
4-73, Sanno-maru, 1 Chome  
**MITO**, Ibaraki 310  
Tel: (0292) 25-7470  
CH,CM,E

Yokogawa-Hewlett-Packard Ltd.  
Sumitomo Seimei 14-9 Bldg.  
Meieki-Minami, 2 Chome  
Nakamura-ku  
**NAGOYA**, 450  
Tel: (052) 571-5171  
CH,CM,CS,E,MS

Yokogawa-Hewlett-Packard Ltd.  
Chuo Bldg.,  
4-20 Nishinakajima, 5 Chome  
Yodogawa-ku  
**OSAKA**, 532  
Tel: (06) 304-6021  
Telex: YHPOSA 523-3624  
A,CH,CM,CS,E,MP,P\*

Yokogawa-Hewlett-Packard Ltd.  
27-15, Yabe, 1 Chome  
**SAGAMIHARA** Kanagawa, 229  
Tel: 0427 59-1311

Yokogawa-Hewlett-Packard Ltd.  
Daiichi Seimei Bldg.  
7-1, Nishi Shinjuku, 2 Chome  
Shinjuku-ku,**TOKYO** 160  
Tel: 03-348-4611  
CH,E

Yokogawa-Hewlett-Packard Ltd.  
29-21 Takaido-Higashi, 3 Chome  
Suginami-ku **TOKYO** 168  
Tel: (03) 331-6111  
Telex: 232-2024 YHPTOK  
A,CH,CM,CS,E,MP,P\*

Yokogawa-Hewlett-Packard Ltd.  
Daiichi Asano Building  
2-8, Odori, 5 Chome  
**UTSUNOMIYA**, Tochigi 320  
Tel: (0286) 25-7155  
CH,CS,E

Yokogawa-Hewlett-Packard Ltd.  
Yasuda Seimei Nishiguchi Bldg.  
30-4 Tsuruya-cho, 3 Chome  
**YOKOHAMA** 221  
Tel: (045) 312-1252  
CH,CM,E

## JORDAN

*Mouasher Cousins Company*  
P.O. Box 1387  
**AMMAN**  
Tel: 24907, 39907  
Telex: 21456 SABCO JO  
CH,E,M,P

## KENYA

*ADCOM Ltd., Inc., Kenya*  
P.O.Box 30070  
**NAIROBI**  
Tel: 331955  
Telex: 22639  
E,M

## KOREA

*Samsung Electronics HP Division*  
12 Fl. Kinam Bldg.  
San 75-31, Yeoksam-Dong  
Kangnam-Ku  
Yeongdong P.O. Box 72  
**SEOUL**  
Tel: 555-7555, 555-5447  
Telex: K27364 SAMSAN  
A,CH,CM,CS,E,M,P

## KUWAIT

*Al-Khaldiya Trading & Contracting*  
P.O. Box 830 Safat  
**KUWAIT**  
Tel: 42-4910, 41-1726  
Telex: 22481 Areeg kt  
CH,E,M

*Photo & Cine Equipment*  
P.O. Box 270 Safat  
**KUWAIT**  
Tel: 42-2846, 42-3801  
Telex: 22247 Matin kt  
P

## LEBANON

*G.M. Dolmadjian*  
*Achrafieh*  
P.O. Box 165.167  
**BEIRUT**  
Tel: 290293  
MP\*\*

*Computer Information Systems*  
P.O. Box 11-6274  
**BEIRUT**  
Tel: 89 40 73  
Telex: 22259  
C

## LUXEMBOURG

Hewlett-Packard Belgium S.A./N.V.  
Blvd de la Woluwe, 100  
Woluwedal  
B-1200 **BRUSSELS**  
Tel: (02) 762-32-00  
Telex: 23-494 paloben bru  
A,CH,CM,CS,E,MP,P

## MALAYSIA

Hewlett-Packard Sales (Malaysia)  
Sdn. Bhd.  
1st Floor, Bangunan British  
American  
Jalan Semantan, Damansara Heights  
**KUALA LUMPUR** 23-03  
Tel: 943022  
Telex: MA31011  
A,CH,E,M,P\*

**MAYLAISIA (Cont'd)**

*Protel Engineering*  
P.O.Box 1917  
Lot 6624, Section 64  
23/4 Pending Road  
Kuching, SARAWAK  
Tel: 36299  
Telex: MA 70904 PROMAL  
Cable: PROTELENG  
A,E,M

**MALTA**

*Philip Toledo Ltd.*  
Notabile Rd.

**MRIEHEL**  
Tel: 447 47, 455 66  
Telex: Media MW 649  
E,P

**MEXICO**

Hewlett-Packard Mexicana, S.A.  
de C.V.  
Av. Periferico Sur No. 6501  
Tepepan, Xochimilco  
16020 MEXICO D.F.  
Tel: 6-76-46-00  
Telex: 17-74-507 HEWPACK MEX  
A,CH,CS,E,MS,P

Hewlett-Packard Mexicana, S.A.  
de C.V.

Ave. Colonia del Valle 409  
Col. del Valle  
Municipio de Garza Garcia  
**MONTERREY**, Nuevo Leon  
Tel: 78 42 41  
Telex: 038 410  
CH

**ECISA**

José Vasconcelos No. 218  
Col. Condesa Deleg. Cuauhtémoc  
**MEXICO D.F. 06140**  
Tel: 553-1206  
Telex: 17-72755 ECE ME  
M

**MOROCCO**

*Dolbeau*  
81 rue Karatchi  
**CASABLANCA**  
Tel: 3041-82, 3068-38  
Telex: 23051, 22822  
E

**Gerep**

2 rue d'Agadir  
Boite Postale 156  
**CASABLANCA**  
Tel: 272093, 272095  
Telex: 23 739  
P

**NETHERLANDS**

Hewlett-Packard Nederland B.V.  
Van Heuven Goedhartlaan 121  
NL 1181KK **AMSTELVEEN**  
P.O. Box 667  
NL 1180 AR **AMSTELVEEN**  
Tel: (020) 47-20-21  
Telex: 13 216 HEPA NL  
A,CH,CM,CS,E,MP,P  
Hewlett-Packard Nederland B.V.  
Bongerd 2  
NL 2906VK **CAPELLE A/D IJSSEL**  
P.O. Box 41  
NL 2900AA **CAPELLE A/D IJSSEL**  
Tel: (10) 51-64-44  
Telex: 21261 HEPAC NL  
A,CH,CS,E

Hewlett-Packard Nederland B.V.  
Pastoor Petersstraat 134-136  
NL 5612 LV **EINDHOVEN**  
P.O. Box 2342  
NL 5600 CH **EINDHOVEN**  
Tel: (040) 326911  
Telex: 51484 hepae nl  
A,CH\*\* ,E,M

**NEW ZEALAND**

Hewlett-Packard (N.Z.) Ltd.  
5 Owens Road  
P.O. Box 26-189  
Epsom, **AUCKLAND**  
Tel: 687-159  
Cable: HEWPACK Auckland  
CH,CM,E,P\*

Hewlett-Packard (N.Z.) Ltd.  
4-12 Cruickshank Street  
Kilbirnie, **WELLINGTON 3**  
P.O. Box 9443  
Courtenay Place, **WELLINGTON 3**  
Tel: 877-199  
Cable: HEWPACK Wellington  
CH,CM,E,P

*Northrop Instruments & Systems Ltd.*  
369 Khyber Pass Road  
P.O. Box 8602

**AUCKLAND**  
Tel: 794-091  
Telex: 60605  
A,M

*Northrop Instruments & Systems Ltd.*  
110 Mandeville St.

P.O. Box 8388  
**CHRISTCHURCH**  
Tel: 486-928  
Telex: 4203  
A,M

*Northrop Instruments & Systems Ltd.*  
Sturdee House  
85-87 Ghuznee Street  
P.O. Box 2406  
**WELLINGTON**  
Tel: 850-091  
Telex: NZ 3380  
A,M

**NORTHERN IRELAND**

See **United Kingdom**

**NORWAY**

Hewlett-Packard Norge A/S  
Folke Bernadottes vei 50  
P.O. Box 3558  
N-5033 **FYLLINGSDALEN** (Bergen)  
Tel: 0047/5/16 55 40  
Telex: 16621 hpnas n  
CH,CS,E,MS

Hewlett-Packard Norge A/S  
Österndalen 16-18  
P.O. Box 34  
N-1345 **ÖSTERÅS**  
Tel: 0047/2/17 11 80  
Telex: 16621 hpnas n  
A,CH,CM,CS,E,M,P

**OMAN**

*Khimjil Ramdas*  
P.O. Box 19  
**MUSCAT**  
Tel: 722225, 745601  
Telex: 3289 BROKER MB **MUSCAT**  
P

*Suhail & Saud Bahwan*  
P.O.Box 169

**MUSCAT**  
Tel: 734 201-3  
Telex: 3274 **BAHWAN MB**

**PAKISTAN**

*Mushko & Company Ltd.*  
1-B, Street 43  
Sector F-8/1  
**ISLAMABAD**  
Tel: 51071  
Cable: FEMUS Rawalpindi  
A,E,M

*Mushko & Company Ltd.*  
Oosman Chambers  
Abdullah Haroon Road  
**KARACHI 0302**  
Tel: 524131, 524132  
Telex: 2894 MUSKO PK  
Cable: COOPERATOR Karachi  
A,E,M,P\*

**PANAMA**

*Electrónico Balboa, S.A.*  
Calle Samuel Lewis, Ed. Alfa  
Apartado 4929  
**PANAMA 5**  
Tel: 63-6613, 63-6748  
Telex: 3483 ELECTRON PG  
A,CM,E,M,P

**PERU**

*Cía Electro Médica S.A.*  
Los Flamencos 145, San Isidro  
Casilla 1030  
**LIMA 1**  
Tel: 41-4325, 41-3703  
Telex: Pub. Booth 25306  
CM,E,M,P

**PHILIPPINES**

*The Online Advanced Systems*  
Corporation  
Rico House, Amorsolo Cor. Herrera  
Street  
Legaspi Village, Makati  
P.O. Box 1510  
Metro **MANILA**  
Tel: 85-35-81, 85-34-91, 85-32-21  
Telex: 3274 ONLINE  
A,CH,CS,E,M

*Electronic Specialists and Proponents*  
Inc.  
690-B Epifanio de los Santos Avenue  
Cubao, **QUEZON CITY**  
P.O. Box 2649 Manila  
Tel: 98-96-81, 98-96-82, 98-96-83  
Telex: 40018, 42000 ITT **GLOBE**  
**MACKAY BOOTH**  
P

**PORTUGAL**

*Mundinter*  
Intercambio Mundial de Comércio  
S.A.R.L.  
P.O. Box 2761  
Av. Antonio Augusto de Aguiar 138  
**P-LISBON**  
Tel: (19) 53-21-31, 53-21-37  
Telex: 16691 munter p  
M  
*Soquímica*  
Av. da Liberdade, 220-2  
1298 **LISBOA** Codex  
Tel: 56 21 81/2/3  
Telex: 13316 SABASA  
P

*Telectra-Empresa Técnica de*  
Equipamentos Eléctricos S.A.R.L.  
Rua Rodrigo da Fonseca 103  
P.O. Box 2531  
**P-LISBON 1**  
Tel: (19) 68-60-72  
Telex: 12598  
CH,CS,E,P

**PUERTO RICO**

Hewlett-Packard Puerto Rico  
Ave. Muñoz Rivera #101  
Esq. Calle Ochoa  
**HATO REY**, Puerto Rico 00918  
Tel: (809) 754-7800  
Hewlett-Packard Puerto Rico  
Calle 272 Edificio 203  
Urb. Country Club  
**RIO PIEDRAS**, Puerto Rico  
P.O. Box 4407  
**CAROLINA**, Puerto Rico 00628  
Tel: (809) 762-7255  
A,CH,CS

**QATAR**

*Compute Arabia*  
P.O. Box 2750  
**DOHA**  
Tel: 883555  
Telex: 4806 **CHPARB**  
P

*Eastern Technical Services*  
P.O.Box 4747

**DOHA**  
Tel: 329 993  
Telex: 4156 **EASTEC DH**  
*Nasser Trading & Contracting*  
P.O.Box 1563  
**DOHA**  
Tel: 22170, 23539  
Telex: 4439 **NASSER DH**  
M

**SAUDI ARABIA**

*Modern Electronic Establishment*  
Hewlett-Packard Division  
P.O. Box 22015  
**Thuobah**  
**AL-KHOBAR**  
Tel: 895-1760, 895-1764  
Telex: 671 106 **HPMEEK SJ**  
Cable: ELECTA **AL-KHOBAR**  
CH,CS,E,M

*Modern Electronic Establishment*  
Hewlett-Packard Division  
P.O. Box 1228  
Redec Plaza, 6th Floor  
**JEDDAH**  
Tel: 644 38 48  
Telex: 4027 12 **FARNAS SJ**  
Cable: ELECTA **JEDDAH**  
CH,CS,E,M

*Modern Electronic Establishment*  
Hewlett-Packard Division  
P.O.Box 22015  
**RIYADH**  
Tel: 491-97 15, 491-63 87  
Telex: 202049 **MEERYD SJ**  
CH,CS,E,M

*Abdul Ghani El Ajou*  
P.O. Box 78  
**RIYADH**  
Tel: 40 41 717  
Telex: 200 932 **EL AJOU**  
P

**SCOTLAND**

See **United Kingdom**

**SINGAPORE**

Hewlett-Packard Singapore (Sales)  
Pte. Ltd.  
#08-00 Inhcaped House  
450-2 Alexandra Road  
P.O. Box 58 Alexandra Rd. Post Office  
**SINGAPORE, 9115**  
Tel: 631788  
Telex: HPSGSO RS 34209  
Cable: HEWPACK, Singapore  
A,CH,CS,E,MS,P



# SALES & SUPPORT OFFICES

Arranged alphabetically by country

## SINGAPORE (Cont'd)

*Dynamar International Ltd.*  
Unit 05-11 Block 6  
Kolam Ayer Industrial Estate  
SINGAPORE 1334  
Tel: 747-6188  
Telex: RS 26283  
CM

## SOUTH AFRICA

Hewlett-Packard So Africa (Pty.) Ltd.  
P.O. Box 120  
Howard Place CAPE PROVINCE 7450  
Pine Park Center, Forest Drive,  
Pinelands

### CAPE PROVINCE 7405

Tel: 53-7954  
Telex: 57-20006  
A,CH,CM,E,MS,P

Hewlett-Packard So Africa (Pty.) Ltd.  
P.O. Box 37099  
92 Overport Drive

### DURBAN 4067

Tel: 28-4178, 28-4179, 28-4110  
Telex: 6-22954  
CH,CM

Hewlett-Packard So Africa (Pty.) Ltd.  
6 Linton Arcade  
511 Cape Road  
Linton Grange

### PORT ELIZABETH 6000

Tel: 041-302148  
CH

Hewlett-Packard So Africa (Pty.) Ltd.  
P.O.Box 33345

### Glenstantia 0010 TRANSVAAL

1st Floor East  
Constantia Park Ridge Shopping  
Centre

Constantia Park

### PRETORIA

Tel: 982043  
Telex: 32163  
CH,E

Hewlett-Packard So Africa (Pty.) Ltd.  
Private Bag Wendywood  
SANDTON 2144  
Tel: 802-5111, 802-5125  
Telex: 4-20877

Cable: HEWPACK Johannesburg  
A,CH,CM,CS,E,MS,P

## SPAIN

Hewlett-Packard Española S.A.  
Calle Entenza, 321  
E-BARCELONA 29  
Tel: 322.24.51, 321.73.54  
Telex: 52603 hpbee  
A,CH,CS,E,MS,P

Hewlett-Packard Española S.A.  
Calle San Vicente S/No  
Edificio Albia II  
E-BILBAO 1  
Tel: 423.83.06  
A,CH,E,MS

Hewlett-Packard Española S.A.  
Crta. de la Coruña, Km. 16, 400  
Las Rozas

### E-MADRID

Tel: (1) 637.00.11

CH,CS,M

Hewlett-Packard Española S.A.  
Avda. S. Francisco Javier, S/no  
Planta 10. Edificio Sevilla 2,

### E-SEVILLA 5

Tel: 64.44.54

Telex: 72933

A,CS,MS,P

Hewlett-Packard Española S.A.  
Calle Ramon Gordillo, 1 (Entlo.3)  
E-VALENCIA 10  
Tel: 361-1354  
CH,P

## SWEDEN

Hewlett-Packard Sverige AB  
Sunnanvagen 14K  
S-22226 LUND

Tel: (046) 13-69-79  
Telex: (854) 17886 (via Spånga  
office)  
CH

Hewlett-Packard Sverige AB  
Östra Tullgatan 3  
S-21128 MALMÖ  
Tel: (040) 70270  
Telex: (854) 17886 (via Spånga  
office)

Hewlett-Packard Sverige AB  
Västra Vintergatan 9  
S-70344 ÖREBRO  
Tel: (19) 10-48-80  
Telex: (854) 17886 (via Spånga  
office)  
CH

Hewlett-Packard Sverige AB  
Skalholtsgatan 9, Kista  
Box 19

### S-16393 SPÅNGA

Tel: (08) 750-2000  
Telex: (854) 17886  
Telefax: (08) 7527781  
A,CH,CM,CS,E,MS,P

Hewlett-Packard Sverige AB  
Frötällsgatan 30  
S-42132 VÄSTRA-FRÖLUNDA  
Tel: (031) 49-09-50  
Telex: (854) 17886 (via Spånga  
office)  
CH,E,P

## SWITZERLAND

Hewlett-Packard (Schweiz) AG  
Clarastrasse 12  
CH-4058 BASEL  
Tel: (61) 33-59-20  
A

Hewlett-Packard (Schweiz) AG  
7, rue du Bois-du-Lan  
Case Postale 365  
CH-1217 MEYRIN 2  
Tel: (0041) 22-83-11-11  
Telex: 27333 HPAG CH  
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Hewlett-Packard (Schweiz) AG  
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